



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
841 Chestnut Building  
Philadelphia, Pennsylvania 19107

RECEIVED

93 OCT -7 AM 11: 29

REGIONAL HEARING CLERK  
EPA, REGION III, PHILA, PA

IN THE MATTER OF:

E.I. duPont de Nemours  
& Company, Inc.

Experimental Station  
Wilmington, Delaware 19898

**RESPONDENT**

EPA I.D. No. DED003930807

Proceeding under Section 3013  
of the Resource Conservation  
and Recovery Act, as amended  
42 U.S.C. § 6934

# FINAL ADMINISTRATIVE ORDER ON CONSENT

U.S. EPA Docket No.  
RCRA-3-016-AM

# Findings of Fact, Conclusions of Law and Determinations, and Order Requiring Submission and Implementation of Proposal for Sampling, Analysis, Monitoring and Reporting

**FINAL ADMINISTRATIVE ORDER ON CONSENT**

**TABLE OF CONTENTS**

I.	Jurisdiction.....	1
II.	Parties Bound.....	2
III.	Statement of Purpose.....	3
IV.	EPA's Findings of Fact.....	3
V.	Conclusions of Law and Determinations.....	9
VI.	Work To Be Performed.....	9
	A. SAMR Plan.....	10
	B. SAMR Program Operation and Maintenance.....	11
	C. Health and Safety Plan.....	13
	D. Waste Minimization Plan.....	13
	E. Deed Restrictions.....	14
	F. Submissions/EPA Approval.....	14
	G. Interim Measures.....	16
VII.	Quality Assurance.....	16
VIII.	Public Review of Administrative Record.....	17
IX.	On-site Access.....	17
X.	Sampling and Data/Document Availability.....	18
XI.	Record Preservation.....	19
XII.	Project Coordinators.....	19
XIII.	Notification.....	20
XIV.	Delay in Performance/Stipulated Penalties.....	21
XV.	Dispute Resolution.....	24
XVI.	Force Majeure and Excusable Delay.....	25
XVII.	Reservation of Rights.....	26
XVIII.	Other Claims.....	27

XIX.	Other Applicable Laws.....	27
XX.	Indemnification of the United States Government....	27
XXI.	Notice of Non-Liability of EPA.....	28
XXII.	Subsequent Modification.....	28
XXIII.	Severability.....	29
XXIV.	Termination and Satisfaction .....	29
XXV.	Attorney's Fees.....	29
XXVI.	No Admission of Liability.....	29
XXVII.	Effective Date.....	30

#### ATTACHMENTS

1. Facility Map showing location of Areas 1 and 2
2. Survey area defining location of Site
3. Map defining location of Site
- A. Scope of Work for Sampling, Analysis, Monitoring and Reporting Program at DuPont Experimental Station, Wilmington, Delaware.
- B. Scope of Work for a Health and Safety Plan
- C. Scope of Work for a Waste Minimization Plan
- D. Scope of Work for a Interim Measures Plan
- E. Scope of Work for a Study of Alternatives
- F. RCRA Record of Decision, dated September 30, 1991.

**UNITED STATES**  
**ENVIRONMENTAL PROTECTION AGENCY**  
**REGION III**

IN THE MATTER OF:	)	FINAL ADMINISTRATIVE
	)	ORDER ON CONSENT
E.I. duPont de Nemours	)	
& Company, Inc.	)	
	)	
Experimental Station	)	U.S. EPA Docket No.
Wilmington, Delaware 19898	)	RCRA-3-016-AM
	)	
RESPONDENT	)	
	)	Findings of Fact, Conclusions
EPA I.D. No. DED003930807	)	of Law and Determinations,
	)	and Order Requiring
Proceeding under Section 3013	)	Submission and Implementation
of the Resource Conservation	)	of Proposal for Sampling,
and Recovery Act, as amended	)	Analysis, Monitoring and
42 U.S.C. § 6934	)	Reporting

**FINAL ADMINISTRATIVE ORDER ON CONSENT**

THE PARTIES to this Final Administrative Order on Consent ("Consent Order" or "Order"), the United States Environmental Protection Agency ("EPA") and E.I. duPont de Nemours & Co., Inc. ("DuPont" or "Respondent"), having agreed to entry of this Consent Order, it is therefore Ordered and Agreed that:

**I. JURISDICTION**

This Consent Order is issued pursuant to the authority vested in the Administrator of the United States Environmental Protection Agency by Section 3013 of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (collectively referred to hereinafter as "RCRA"), 42 U.S.C. Section 6934. The authority vested in the Administrator has been delegated to the Regional Administrators by EPA Delegation No. 8-20 dated March 6, 1986, and further delegated to the Director and the Associate Director, Office of RCRA Programs, Hazardous Waste Management Division, by EPA Delegation No. 8-20, dated November 22, 1989.

On June 22, 1984, the EPA granted the State of Delaware (the "State") authorization to operate a hazardous waste program in lieu of EPA, pursuant to Section 3006(b) of RCRA, 42 U.S.C. Section 6926(b). The State, however, does not have authority to

enforce Section 3013 of RCRA. EPA is notifying the State that this Consent Order is being issued by providing a copy to the State.

This Consent Order is issued to Respondent, the owner and operator of a facility known as the E.I. duPont de Nemours & Co., Inc. Experimental Station, located on Route 141 in Wilmington, Delaware (the "Facility"). The Facility is approximately 125 acres in size. The area of concern (the "Site"), which is the primary study area subject to this Order, is approximately 6 acres in size. The Site also includes any contiguous areas to which contaminants from the study area migrated. The Site's location within the Facility, set forth in metes and bounds, is identified in the survey and map appended hereto as Attachments 2 and 3.

The Findings and Fact, the Conclusions of Law and the Determinations in this Consent Order have been made by EPA and are not admitted by Respondent. Nevertheless, Respondent consents to and agrees not to contest EPA's jurisdiction to issue this Consent Order and to enforce its terms. Further, Respondent will not contest EPA's jurisdiction to: compel compliance with this Consent Order in any subsequent enforcement proceedings, either administrative or judicial; require Respondent's full or interim compliance with the terms of this Consent Order; or impose sanctions for violations of this Consent Order.

## II. PARTIES BOUND

A. This Consent Order shall apply to and be binding upon EPA, Respondent and their agents, successors and assigns.

B. No change in ownership of any property covered by this Consent Order or in the corporate or partnership status of Respondent shall in any way alter, diminish, or otherwise affect Respondent's obligations and responsibilities under this Consent Order.

C. Respondent shall provide a copy of this Consent Order to all supervisory personnel, contractors, subcontractors, laboratories, and consultants retained to conduct and/or monitor any portion of the work performed pursuant to this Consent Order within seven (7) calendar days of the effective date of this Consent Order or date of such retention, whichever is later. All contracts, agreements, or other arrangements with such persons shall require such persons to conduct and/or monitor the work in accordance with the requirements of this Consent Order. Notwithstanding the terms of any such contract, agreement, or arrangement, Respondent is responsible for complying with this Consent Order and ensuring that all such persons conduct and/or monitor such work in accordance with this Consent Order.

D. In the event of any change in ownership or operation of the Facility and/or in the event of any change in majority ownership or control of Respondent, Respondent shall notify EPA in writing of the nature of any such change no later than fifteen (15) calendar days after the effective date of such change. In addition, Respondent shall provide a copy of this Consent Order to any successor to the Respondent and/or to the Facility at least fifteen (15) calendar days prior to the effective date of such change.

### III. STATEMENT OF PURPOSE

In entering into this Consent Order, the mutual objective of EPA and Respondent is protection of human health and the environment through Respondent's implementation of the Sampling, Analysis, Monitoring and Reporting ("SAMR") Program selected by EPA in the RCRA Record of Decision ("RCRA ROD") for the Facility, dated September 30, 1991, set forth herein as Attachment F.

### IV. EPA'S FINDINGS OF FACT

1. Respondent is a corporation doing business in the State of Delaware and is a "person" as defined in Section 1004(15) of RCRA, 42 U.S.C. Section 6903(15), and 7 Delaware Code Section 6302(10) of the Delaware Hazardous Waste Management Act.
2. Respondent operates a corporate research and development facility located on Route 141 in Wilmington, Delaware. The property on which the facility is located, and all contiguous property under the ownership or control of Respondent, is hereinafter referred to as the "Facility."
3. Respondent owned and/or operated its Facility as a hazardous waste management facility on and after November 19, 1980, the applicable date which renders facilities subject to the interim status requirements under Sections 3004 and 3005 of RCRA, 42 U.S.C. Sections 6924 and 6925.
4. On August 11, 1980, Respondent submitted to EPA a Notification of Hazardous Waste Activity for the Facility, pursuant to Section 3010 of RCRA, 42 U.S.C. Section 6930. In the Notification, Respondent identified itself as a generator of hazardous waste and an owner/operator of a treatment, storage, and/or disposal facility. EPA assigned the Facility EPA identification number DED 00 393 0807 on October 7, 1980.
5. Respondent submitted to EPA a Part A Permit Application ("Part A") for the Facility on November 19, 1980, pursuant to Section 3005 of RCRA, 42 U.S.C. Section 6925. This Part A

listed the following hazardous waste management activities at the facility: hazardous waste disposal in a landfill(s) (D80), hazardous waste treatment in an incinerator (T03), and hazardous waste storage in containers (S01) and in a hazardous waste storage tank (S02).

6. By submitting its Notification and Part A Permit Application as described in paragraphs 4 and 5 above, Respondent fulfilled the requirements for interim status pursuant to Sections 3004 and 3005 of RCRA, 42 U.S.C. Sections 6924 and 6925.
7. Respondent amended its Part A on June 30, 1981. This amendment deleted the landfill disposal (D80) and replaced that unit with a container storage area (S01).
8. In a letter dated September 4, 1981, EPA agreed to Respondent's request that the storage tank (S02) be deleted from Respondent's original Part A as this unit was part of incinerator treatment (T03).
9. On September 2, 1982, EPA requested that Respondent submit a Part B Permit Application ("Part B"). This Part B was received by EPA on February 25, 1983.
10. On September 30, 1985, the State of Delaware, Department of Natural Resources and Environmental Control, ("DNREC") issued a permit to the Respondent for the treatment and storage of hazardous wastes at the Facility. This permit covered the incinerator and three hazardous waste storage units: (a) two outdoor storage pads for storing hazardous wastes prior to incineration, (b) two outdoor storage pads for storing hazardous wastes to be shipped offsite for disposal, and (c) one storage area located inside building number 243 for storing hazardous wastes prior to offsite disposal.
11. Respondent's DNREC permit allowed the following hazardous wastes (identified by the EPA hazardous waste number) to be stored at the Facility:
  - (a) Hazardous wastes exhibiting the characteristics of ignitability, corrosivity, reactivity, and EP toxicity as identified at Del. Reg. Sections 261.20 - 261.24 (40 C.F.R. 261.20 - 261.24), (D001-D017);
  - (b) Hazardous wastes from non-specific sources identified at Del. Reg. Section 261.31 (40 C.F.R. Section 261.31), (F001-F005);
  - (c) Commercial chemical products, manufacturing chemical intermediates, off-specification commercial chemical products, or manufacturing chemical intermediates

identified at Del. Reg. Section 261.33(e) (40 C.F.R. Section 261.33(e)), (P001-P123); and

- (d) Commercial chemical products, manufacturing chemical intermediates, off-specification commercial chemical products, or manufacturing chemical intermediates identified at Del. Reg. Section 261.33(f) (40 C.F.R. Section 261.33(f)), (U001-U247).
12. Respondent's DNREC permit allowed the following hazardous wastes (identified by the EPA hazardous waste number) to be treated at the Facility:
- (a) Hazardous wastes exhibiting the characteristics of ignitability, corrosivity, reactivity, and EP toxicity as identified at Del. Reg. Sections 261.20 - 261.24 (40 C.F.R. Sections 261.20 - 261.24), (D001-D017);
  - (b) Hazardous wastes from non-specific sources identified at Del. Reg. Section 261.31 (40 C.F.R. Section 261.31), (F001-F005, F007, and F009);
  - (c) Commercial chemical products, manufacturing chemical intermediates, or off-specification commercial chemical products identified at Del. Reg. Section 261.33(e) (40 C.F.R. Section 261.33(e)), (P001-P123); and
  - (d) Commercial chemical products, manufacturing chemical intermediates, or off-specification commercial chemical products identified at Del. Reg. Section 261.33(f) (40 C.F.R. Section 261.33(f)), (U001-U074, U076-U120, U122-U247).
13. In July 1986, a deposit of contaminated soil was unearthed along the southern boundary of the Facility near Brandywine Creek (hereafter referred to as "Area 1" in the map attached hereto as Attachment 1) during a routine excavation for tapping an underground waterline. This soil was found beneath a macadam<sup>1</sup> road. Soil samples were taken and analyzed by Respondent.
14. In a letter dated October 10, 1986, to DNREC and EPA, Respondent submitted analytical results conducted in July, 1986, of the contaminated soil. The resulting data showed the presence of several hazardous constituents as defined in Del. Reg. Section 261 (40 C.F.R. Part 261) in the soil. These sample results are summarized below showing the highest concentrations in parts per million ("ppm") of organic contamination detected.

<sup>1</sup> macadam - a road constructed by compacting into a solid mass a layer of small broken stone on a convex well-drained roadbed and using a binder (as cement or asphalt) for the mass.

July 1986 Soil Sample Results

<u>Hazardous Constituent</u>	<u>Depth from Soil Surface</u>	<u>Conc. (ppm)</u>
Ethylbenzene	6.0 to 8.0 ft.	35
Ethylbenzene	7.5 to 8.5 ft.	10
Toluene	6.0 to 8.0 ft.	11
Toluene	7.5 to 8.5 ft.	4
Xylene	6.0 to 8.0 ft.	80
Xylene	7.5 to 8.0 ft.	34

15. Reference doses ("RfDs") for ethylbenzene, toluene, and xylene are listed below. Reference doses are those daily intakes for which the most sensitive members of a human population should suffer no adverse health effects. Such limits have been established for noncarcinogenic substances in lieu of  $10^{-6}$  cancer risk factors for carcinogens.

<u>Hazardous Constituent</u>	<u>Reference Dose (mg/l)</u>
Ethylbenzene	3.5
Toluene	10.5
Xylene	70.0

The possible health effects from exposure to these constituents can be found in the Physicians Desk Reference. However, there is no evidence that these constituents are present at the Site in locations or amounts which would expose Facility personnel or the public to the above-referenced doses.

16. An extensive record search by Respondent revealed that Area 1 had been a burning pit which had been used by Respondent from 1900 to 1946.
17. On March 27, 1987, Respondent informed EPA that approximately two weeks prior to March 27, 1987, during the excavation of a water main trench, another area of contaminated soil was unearthed identified as Area 2 in Attachment 1. This area was located approximately 100 feet southwest of the contaminated area described above in paragraph 13. Preliminary findings indicated the contamination was similar to that found at Area 1. Based on historical and analytical information collected during the RFI, Respondent concluded that during construction of a parking lot, contaminated soil from Area 1 was used as fill material for Area 2.
18. The primary source area for soil contaminated with VOCs and polynuclear aromatic hydrocarbons ("PAHs") appears to be the former burning area near Building 311. The secondary source is along Creek Road (Area 2, Attachment 1) where ash from

the burning ground was likely used as fill material when the former Building 255 was demolished and removed sometime between 1948 and 1955. Samples of soils in the vicinity of the former burning ground were consistently higher in concentrations of PAHs and VOCs than other areas of the site.

19. On February 15, 1989, EPA and Respondent entered into an Administrative Order on Consent, Docket Number RCRA-III-010-AM, pursuant to RCRA Section 3013, requiring Respondent to perform a RCRA Facility Investigation ("RFI") to delineate the vertical and horizontal extent of contamination at the Site and to conduct a Study of Alternatives ("SOA") for remediation at the Site (hereafter, the "3013 Order").
20. On September 18, 1990, Respondent submitted to EPA an RFI Report which defined the vertical and horizontal extent of contamination at the Site. EPA approved the RFI Report in February 1991.
21. The RFI Report analyzed surface waters for priority pollutant volatile organic aromatics ("VOAs"), priority pollutant inorganics and biphenyl/biphenyl oxide. No samples were found to be above detection levels.
22. Subsequent to EPA's approval of Respondent's RFI report, EPA and Respondent agreed that a Risk Assessment should be performed at the Site. Respondent completed and submitted the Risk Assessment Report to EPA on June 21, 1991. EPA approved the Risk Assessment Report in August 1991.
23. According to the Risk Assessment Report the maximum level of contamination found in soil is 46,960 parts per billion ("ppb") of benzo[a]pyrene equivalents. The calculated risk of  $10^{-5}$  for this contaminant was identified using the industrial worker exposure scenario. To be protective of human health and/or the environment during an excavation event, Respondent would have to remediate the soil to 790 ppb of benzo[a]pyrene. However, worker exposure to contaminated soil is not probable due to concrete pavement and approximately 4 feet of clean fill above the contaminated soil.
24. A portion of Respondent's Facility abuts the Brandywine Creek. The Brandywine Creek is used as the primary drinking water source for the City of Wilmington, Delaware, as well as for recreational purposes. The drinking water intakes for Wilmington are located downstream of the Respondent's Facility. The hazardous waste management units at the Facility described above in paragraph 10 are approximately 300 feet from the Brandywine Creek.
25. The rock underlying the Facility is an impermeable

crystalline rock. Groundwater flow is restricted to narrow, widely-spaced fractures and is therefore a low yielding source of water. It would not be practical to use this aquifer as a source of drinking water. Respondent's Risk Assessment concluded that the low productivity of this aquifer would make it an unlikely choice for a drinking water source in the future.

26. Groundwater below the Site contains VOCs at concentrations that exceed Maximum Contaminant Levels ("MCLs"). MCLs are federally enforceable drinking water standards developed under the Safe Drinking Water Act, 42 U.S.C. Section 300f et seq. (40 C.F.R. Section 141.12). The maximum VOC concentration recorded in site groundwater was 7700 ppb of trichloroethene ("TCE"). The MCL for TCE is 5 ppb. The health effects on animals from exposure to TCE can be found in the Administrative Record.
27. The groundwater under the Facility flows towards and discharges into Brandywine Creek. Based on the average flow of the Brandywine Creek over the past 42 years in comparison to the average discharge rate of the groundwater estimated in the RFI Report, Respondent concluded in the Corrective Measure Study ("CMS") that there would be a dilution factor of 10,000, bringing levels of TCE, 1,2 Dichloroethene (1,2, DCE) and vinyl chloride under the MCL for each such contaminant, 5, 100, and 2 ppb respectively.
28. In Respondent's CMS submitted to EPA on July 8, 1991, Respondent recommended a "No Further Action with Monitoring" alternative (see Attachment F). A summary of the alternative is presented below:

The "No Further Action with Monitoring" alternative consists of a five-year monitoring program. The monitoring activities involves groundwater sampling, analysis of samples for VOCs, and the measurement of groundwater elevation in Facility wells. This monitoring will be conducted quarterly for the first year, semi-annually the next three years and once during the fifth year. Deed restrictions will be recorded to address the possibility of use of groundwater for drinking water purposes and for the excavation of contaminated soil.

29. Respondent's RFI and CMS Reports and an EPA Statement of Basis summarizing both reports were made available to the public for a thirty-day comment period, which began on August 26, 1991 and ended on September 25, 1991. EPA held a public meeting on September 17, 1991 to discuss the Facility background and the reports. No one from the general public attended the public meeting.

30. In the RCRA ROD signed on September 30, 1991, EPA approved the CMS Report and selected the "No Further Action with Monitoring" alternative as the corrective measure alternative for the Facility.

**V. EPA'S CONCLUSIONS OF LAW AND DETERMINATIONS**

A. Respondent is a "person" within the meaning of Section 1004(15) of RCRA, 42 U.S.C. Section 6903(15).

B. Hazardous wastes have been and/or are currently being treated, stored and/or disposed of and are present at the Facility within the meaning of Section 3013 of RCRA, 42 U.S.C. Section 6934.

C. There is or has been a release of hazardous wastes from the Facility within the meaning of Section 3013 of RCRA, 42 U.S.C. Section 6934.

D. The past and/or present treatment, storage and/or disposal of hazardous waste at the Facility and/or the release of such hazardous waste may present a substantial hazard to human health or the environment within the meaning of Section 3013 of RCRA, 42 U.S.C. Section 6934.

E. The actions required by this Consent Order are reasonable to ascertain the nature and extent of such hazard.

**VI. WORK TO BE PERFORMED**

In order to monitor the extent of the hazard that may be present at the Site, and to ensure protection of human health and the environment, Respondent is hereby ordered, pursuant to Section 3013 of RCRA, 42 U.S.C. Section 6934, to conduct certain sampling, analysis, monitoring, and reporting activities as set forth in the Sampling, Analysis, Monitoring and Reporting ("SAMR") Program set forth in Attachment A.

EPA acknowledges that Respondent may have completed some of the tasks required by this Consent Order and that Respondent may have available some of the information, plans, including, but not limited to, the Health and Safety Plan and the Waste Minimization Plan accepted by EPA during the RFI, and data required by this Consent Order. This previous work may be used to meet the requirements of this Consent Order, upon submission to and formal approval by EPA.

Pursuant to Section 3013 of RCRA, 42 U.S.C. Section 6934, Respondent agrees to and is hereby ordered to perform the following acts in the manner and by the dates specified herein. All work undertaken pursuant to this Consent Order shall be

developed and performed in accordance with, at a minimum: the Scope of Work for a Sampling, Analysis, Monitoring and Reporting ("SAMR") Plan set forth in Attachment A; the Health and Safety Plan set forth in Attachment B, the Scope of Work for a Waste Minimization Plan set forth in Attachment C; the Scope of Work for an Interim Measures ("IM") Plan set forth in Attachment D; the Scope of Work for a Study of Alternatives set forth in Attachment E; the RCRA Record of Decision ("ROD") for the Facility set forth in Attachment F; RCRA, its implementing regulations and all relevant EPA guidance documents. All Attachments to this Consent Order are incorporated herein by reference. Relevant EPA guidance documents may include, but are not limited to, the "RCRA Ground Water Monitoring Technical Enforcement Guidance Document" (OSWER Directive 9950.1, September 1986), "Test Methods For Evaluating Solid Waste" (SW-846, November 1986) and "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities" (EPA 530/SW-85-031, July 1986), and "OWRS Guidance for Preparation of QA Project Plans" (OWRS QA-1, May, 1984). "Days" as set forth herein are calendar days unless specified otherwise.

#### A. SAMPLING, ANALYSIS, MONITORING, AND REPORTING ("SAMR") PLAN

1. Within thirty (30) calendar days of the effective date of this Consent Order, Respondent shall submit to EPA for approval a Draft Sampling, Analysis, Monitoring and Reporting ("SAMR") Plan which will describe the manner in which the Respondent shall implement the SAMR Program and comply with all requirements identified in the RCRA ROD. The SAMR Plan shall be developed in accordance with Attachment A, Task I, and shall comply with, at a minimum, RCRA, its implementing regulations, and relevant EPA guidance.

2. The Draft SAMR Plan shall include but not be limited to:

- a. a Program Management Plan,
- b. a Quality Assurance Program Plan,
- c. a Data Management Plan,
- d. an Operations and Maintenance Plan,
- e. a Community Relations Plan and
- f. Cost Estimates for Implementation of the SAMR Program.

3. Within forty-five (45) calendar days of receipt of EPA's comments on the Draft SAMR Plan submitted pursuant to paragraph 1 above, Respondent shall submit to EPA for approval a Revised SAMR Plan which addresses and/or remedies any comments or deficiencies provided or identified by EPA.

4. Upon receipt of EPA approval of the Revised SAMR Plan, Respondent shall implement the EPA-approved SAMR Plan in

accordance with the requirements and schedules set forth therein.

#### **B. SAMR PROGRAM OPERATION AND MAINTENANCE**

1. For the period of one year from receipt of EPA approval of the SAMR Plan, Respondent shall sample all fourteen (14) groundwater monitoring wells (MW-1A, MW-1B, MW-2A, MW-2B, MW-3A, MW-3B, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10 and MW-11). The monitoring wells shall be sampled quarterly (every three (3) months) beginning with the second full month after EPA approval of the SAMR Plan. During the period from the second to fourth year from receipt of EPA approval of the SAMR Plan, the Respondent shall sample all fourteen (14) groundwater monitoring wells semi-annually (every six (6) months). The initial sampling during the period from the second through fourth year from receipt of EPA approval of the SAMR Plan, shall occur during the seventeenth (17) month from receipt of EPA approval of the SAMR Plan. During the period of the fifth (5) year after receipt of EPA approval of the SAMR Plan, Respondent shall sample all fourteen (14) groundwater monitoring wells annually (once every twelve (12) months). The first sampling shall occur during the fifty-ninth (59) month after receipt of EPA approval of the SAMR Plan. Respondent shall continue the annual sampling until EPA determines that further monitoring is not required. All sampling required pursuant to this paragraph shall be performed during the first fourteen (14) calendar days of the specified month. Two months after each sampling event, by the fifteenth (15) day of the month, Respondent shall submit to EPA a Monitoring Report containing the information required as set forth in Attachment A, Task II.

2. Two (2) years after the first Monitoring Report submission, required under Section VI.B paragraph 1 of this Order, and every two (2) years thereafter, Respondent shall submit to EPA for approval a Draft SAMR Biannual Assessment Report in accordance with Attachment A Task II. Such Report shall contain an evaluation of the SAMR Program in maintaining the SAMR Program Standard ("Standard") specified in Attachment A.

3. Five (5) years after the first Monitoring Report submission, required under Section VI.B paragraph 1 of this Order, and every five (5) years thereafter, Respondent shall submit to EPA for approval a Draft SAMR Five-Year Assessment Report. Such Report shall contain an evaluation of the past and projected future effectiveness of the SAMR Program in maintaining the Standard set forth in Attachment A.

4. Within thirty (30) calendar days of receipt of EPA's comments on each Draft SAMR Biannual or Draft Five-Year Assessment Report submitted to EPA pursuant to this Section of this Consent Order, the Respondent shall submit to EPA for approval a Revised SAMR Assessment Report which addresses and/or

remedies any deficiencies in the Draft Assessment Report identified by EPA.

5. If EPA determines, based on any Assessment Report, Monitoring Report or any other relevant information, that the SAMR Program Standard has been exceeded, it shall notify Respondent. Respondent shall resample all of the wells within thirty (30) calendar days after receipt of notification from EPA. If the Standard is still being exceeded, EPA may notify Respondent that further corrective measures are needed.

6. Within sixty (60) calendar days of receipt of notification from EPA that further Corrective Measures are needed, Respondent shall submit to EPA for approval a Draft Study of Alternatives (SOA) Report in accordance with the SOA Scope of Work in Attachment E.

7. Within thirty (30) calendar days of receipt of EPA's comments on the Draft SOA Report, Respondent shall submit to EPA for approval a Revised SOA Report which addresses and/or remedies deficiencies identified by EPA in the Draft SOA Report.

8. Respondent may at EPA's discretion be provided with a period of sixty (60) calendar days from the date of receipt of EPA approval of the Revised SOA within which to reach an agreement with EPA on implementing the Revised SOA.

9. Nothing in this Section VI.B shall limit EPA's authority to implement the SAMR Program or Supplemental Corrective Measure(s) or to take any other appropriate action under RCRA, the Comprehensive Environmental Response, Compensation and Liability Act, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. Section 9601 et seq. ("CERCLA"), or any other legal authority, including the issuance of a unilateral administrative order or the filing of a civil action.

10. Five years from the date of submittal of the first Monitoring Report, the schedule and need for monitoring will be reviewed by Respondent and recommendations will be submitted to EPA for evaluation. If after five years, the Respondent concludes that the SAMR Program has been fully implemented and the SAMR Program Standard (and/or the Alternative Performance Standards, if any) have been maintained for the five year period, the Respondent shall submit to EPA for approval a report explaining the basis for Respondent's conclusions. Respondent's report shall include all available documentation supporting such conclusion and be accompanied by the Certification of Completion required in XIII.C of this Consent Order.

### **C. HEALTH AND SAFETY PLAN**

Concurrent with the submission of the Draft SAMR Plan, as required under Section VI.A of this Order, the Respondent shall submit to EPA a SAMR Health and Safety Plan in accordance with the provisions of Attachment B of this Consent Order.

### **D. WASTE MINIMIZATION PLAN**

1. Within one hundred and eighty (180) calendar days of the effective date of this Consent Order, Respondent shall submit to EPA for review and comment a plan to minimize the generation of hazardous waste at the Site (the "Waste Minimization Plan" or "Plan"). This Plan shall be developed in accordance with the Scope of Work for a Waste Minimization Plan contained in Attachment C and shall describe procedures to minimize the volume, mobility and toxicity of hazardous waste generated at the Site.

2. Within sixty (60) calendar days after receipt of EPA comments on the draft Waste Minimization Plan, Respondent shall submit to EPA a Revised Waste Minimization Plan incorporating EPA's comments to the extent practicable and explaining why any comments not incorporated are impracticable to incorporate. Concurrent with such submission, Respondent shall implement the Revised Waste Minimization Plan, in accordance with the requirements and schedule contained therein.

3. Respondent shall review, assess the effectiveness of, and revise the Waste Minimization Plan, as appropriate, on an annual basis to further reduce the volume, mobility and/or toxicity of the hazardous waste generated at the Site. During the pendency of this Consent Order, Respondent shall submit an annual Waste Minimization Report to EPA. Such Waste Minimization Report shall be prepared and submitted to EPA one year from the due date of the original plan and shall include: an assessment of the effectiveness of Respondent's existing Plan; a description of the changes in volume, mobility and toxicity of waste actually achieved during the year in comparison to previous years; a description of areas where potential improvements in waste minimization at the Site may be achieved; a copy of all revisions to the Waste Minimization Plan; an explanation and description of how such revision(s) have enabled the Respondent to further minimize the volume, mobility and/or toxicity of the hazardous waste generated at the Site; and any anticipated revisions to the Plan along with the projected changes in volume, mobility and/or toxicity of the waste generated as a result of implementing such revision(s).

**E. DEED RESTRICTIONS**

A. On and after the effective date of this Consent Order, Respondent shall comply with the following restrictions of activities at the Site:

1. No placement of groundwater wells at the Site for use as a source of drinking water, cooking water, bathing water or other domestic uses.
2. Any excavation work to be conducted within the Site shall be performed upon prior notice to EPA, and during such construction activity access shall be restricted.
3. No use of the property underlying the Site that may permit dermal contact with soils or groundwater.

B. Within thirty (30) calendar days of the effective date of this Consent Order, Respondent shall submit for EPA approval proposed language for the filing with and/or on the deed, title easement and any portion of the property the covenants running with the land which state the provisions listed above. Filing shall take place within (30) day of receiving EPA approval of deed restriction language.

**F. SUBMISSIONS/EPA APPROVAL/ADDITIONAL WORK**

1. EPA will review Respondent's SAMR Plan, and any other documents submitted pursuant to Attachments A, D and E ("Submissions"). EPA has the right to comment on any such Submission and/or to modify same.

2. EPA will notify Respondent in writing of EPA's approval or disapproval of the SAMR Plan and any other Submission provided to EPA pursuant to this Consent Order, with the exception of the Health and Safety Plan, Waste Minimization Plan and the Monitoring Reports. Any such Submission approved by EPA under this Order shall be deemed incorporated into and made an enforceable part of this Order. In the event of EPA's disapproval, EPA shall specify in writing any deficiencies in the Submission disapproved by EPA.

3. Within thirty (30) calendar days of receipt of EPA's comments on and/or disapproval of a Submission, Respondent shall submit to EPA for approval a revised submission ("Revised Submission") which addresses and responds to any comments received from EPA and remedies any deficiencies identified by EPA. In the event EPA disapproves of the revised submission, EPA reserves the right to prepare the Submission in lieu of Respondent and seek reimbursement of the costs incurred from the

Respondent.

4. Four (4) copies of all Submissions (including Revised Submissions) required to be submitted by this Consent Order shall be hand-delivered or sent by Certified Mail, Return Receipt Requested, to the EPA Project Coordinator designated pursuant to Section XII, "PROJECT COORDINATORS", below.

5. All work performed pursuant to this Consent Order shall be under the direction and supervision of a professional engineer or geologist with expertise in hazardous waste site investigation. Within thirty (30) calendar days after the effective date of this Consent Order, Respondent shall submit to EPA, in writing, the name, title, and qualifications of the engineer or geologist and of any contractors or subcontractors to be used in carrying out the terms of this Consent Order. Notwithstanding Respondent's selection of an engineer, geologist, contractor or subcontractor, nothing herein shall relieve Respondent of its obligation to comply with the terms and conditions of this Consent Order. EPA shall have the right to disapprove at any time the use of any professional engineer, geologist, contractor or subcontractor selected by Respondent. Respondent shall notify EPA ten (10) days prior to the addition of or any other change of the engineer or geologist, and/or contractors or subcontractors to be used in carrying out the terms of this Order, and shall submit to EPA, in writing, the name, title and qualifications of the additional or replacement engineer, geologist, contractor or subcontractor. EPA shall have the right to disapprove at any time the use of any professional engineer, geologist, contractor or subcontractor selected by Respondent. EPA's disapproval shall not be subject to review under Section XV of this Consent Order (DISPUTE RESOLUTION) or otherwise. Within thirty (30) calendar days of receipt of written notice from EPA disapproving the use of any professional engineer, geologist, contractor or subcontractor, Respondent shall notify EPA, in writing, of the name, title and qualifications of the personnel who will replace the personnel disapproved by EPA. In the event of subsequent disapproval of the proposed replacement, EPA reserves the right to conduct the work required pursuant to this Order and seek reimbursement from Respondent.

6. EPA may determine that certain sampling, monitoring, analysis and/or reporting tasks require additional work to reasonably ascertain the nature and extent of the hazard to human health or the environment. These tasks may or may not have been in the SAMR Plan. When EPA determines that such additional work is necessary, EPA may request, in writing, that Respondent perform the additional work and shall specify the basis for EPA's determination that such additional work is necessary. Within thirty (30) calendar days after the receipt of such request, Respondent shall have the opportunity to meet or confer with EPA to discuss the additional work. In addition, EPA reserves the

right to order Respondent to perform such additional work; to perform such additional work itself and to seek to recover from Respondent all costs of performing such additional work; and to disapprove of the SAMR Plan or any other Submission.

#### G. INTERIM MEASURES ("IM")/SITE STABILIZATION

1. If at any time during the pendency of this Consent Order Respondent obtains or discovers information concerning a release of any hazardous waste or hazardous constituent at or from the Facility into the environment in addition to or different from that described in Section IV (EPA'S FINDINGS OF FACT), Respondent shall immediately notify EPA orally of such release and in writing within three (3) calendar days of providing oral notification. The notification shall describe the nature and extent of the release and any threat or potential threat to human health or the environment posed by such release. If EPA determines that corrective action for such release is necessary to protect human health or the environment, EPA shall notify Respondent. Within ten (10) calendar days of receipt of such notice from EPA, Respondent shall submit to EPA for approval an Interim Measures ("IM") Workplan which identifies Interim Measures which will protect human health and the environment from such release and which are, to the extent practicable, consistent with and integrated into any long-term remediation at the Facility.

2. Each IM Workplan shall be developed in accordance with the Scope of Work for an Interim Measures Plan set forth in Attachment D to this Order.

3. Concurrent with submission of an IM Workplan, Respondent shall submit to EPA an IM Health and Safety Plan in accordance with Attachment B of this Consent Order.

4. Within thirty (30) calendar days of receipt of EPA's comments on the IM Workplan, Respondent shall submit to EPA for approval a Revised IM Workplan which addresses and responds to any comments received from EPA and remedies any deficiencies identified by EPA.

5. Upon receipt of EPA approval of the Revised IM Workplan, Respondent shall implement the approved Revised IM Workplan in accordance with the requirements and schedules contained therein.

#### VII. QUALITY ASSURANCE

In order to provide quality assurance and maintain quality control throughout all sample collection and analysis activities, Respondent shall use EPA-approved quality assurance, quality

control, and chain-of-custody procedures, as specified in Attachment A. In addition, Respondent shall:

1. Ensure that each laboratory used by Respondent for analyses performs such analyses according to the EPA methods included in "Test Methods for Evaluating Solid Waste" (SW-846, November 1986) or other methods deemed satisfactory to EPA. If methods other than EPA methods are to be used, Respondent shall submit all protocols to be used for analyses to EPA for approval at least thirty (30) calendar days prior to the commencement of analyses and shall obtain EPA approval prior to the use of such protocols.
2. Ensure that each laboratory used by Respondent for analyses participates in a quality assurance/quality control program equivalent to that which is followed by EPA. As part of such a program, and upon request by EPA, each laboratory shall perform analyses of samples provided by EPA to demonstrate the quality of the analytical data.
3. Ensure that EPA personnel and/or EPA authorized representatives are allowed access at all reasonable times to the laboratory and personnel utilized by Respondent for analyses performed pursuant to this Order.
4. Inform the EPA Project Coordinator at least fourteen (14) calendar days in advance of any laboratory analysis regarding which laboratory will be used by Respondent and ensure that EPA personnel and EPA-authorized representatives have access at all reasonable times to the laboratories and personnel used for analysis.

#### VIII. PUBLIC REVIEW OF ADMINISTRATIVE RECORD

The Administrative Record supporting the issuance of this Order will be available for public review on Mondays through Fridays, from 9:00 a.m. to 5:00 p.m., by contacting the EPA Project Coordinator, Deborah R. Goldblum at:

U.S. Environmental Protection Agency (3HW61)  
841 Chestnut Building  
Philadelphia, Pennsylvania 19107  
Telephone # 215-597-6688

#### IX. ON-SITE ACCESS

1. EPA and/or its authorized representatives shall have the authority to enter and freely move about all property at the Site during the effective dates of this Order for the purposes of, inter alia: interviewing Facility personnel and contractors regarding matters related to this Order; inspecting records,

operating logs, and contracts regarding matters related to this Order; reviewing the progress of Respondent in carrying out the terms of this Order; conducting such tests, sampling or monitoring as EPA, including its Project Coordinator, deem necessary; using a camera, sound recording, or other documentary type equipment; and verifying the reports and data submitted to EPA by Respondent. Respondent shall permit such persons to inspect and copy all records, files, photographs, documents, and other writings, including all sampling and monitoring data, that pertain to work undertaken pursuant to this Order.

2. Nothing in this Order shall limit or otherwise affect whatever rights of access and entry EPA may have under any law including, but not limited to, RCRA and the Comprehensive Environmental Response, Compensation and Liability Act, as amended ("CERCLA").

#### X. SAMPLING AND DATA/DOCUMENT AVAILABILITY

1. Respondent shall submit to EPA the results of all sampling and/or tests or other data generated by, or on behalf of Respondent pursuant to the requirements of this Order and the Attachments appended hereto and incorporated herein.

2. Respondent shall notify EPA, in writing, at least fourteen (14) calendar days in advance of engaging in any construction activities at the Site including, but not limited to, well drilling, installation of equipment, or sampling related to this Order. At the request of EPA, Respondent shall provide or allow EPA or its authorized representatives to take split or duplicate samples of all samples collected by Respondent pursuant to this Order. Nothing in this Order shall limit or otherwise affect EPA's authority to collect samples pursuant to applicable law, including, but not limited to, RCRA and CERCLA.

3. Respondent may assert a business confidentiality claim covering all or part of any information submitted to or taken by EPA pursuant to Section IX, paragraph 1 above, or other provisions of this Order in the manner described in 40 C.F.R. Section 2.203(b). Any assertion of confidentiality shall be adequately substantiated by Respondent when the assertion is made in accordance with 40 C.F.R. Section 2.204(e)(4). Information subject to a confidentiality claim shall be disclosed only to the extent and by means of the procedures set forth in 40 C.F.R. Part 2, Subpart B. If no such confidentiality claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA without further notice to Respondent. Respondent shall not assert any confidentiality claim with regard to any physical, sampling, monitoring, or analytical data.

4. In the event that Respondent asserts a privilege with regard to any document which EPA wishes to inspect or copy

pursuant to this Order, Respondent shall identify the document, the privilege claimed and the basis therefor in writing within fourteen (14) calendar days from the date of EPA's request to inspect or copy such document. For the purposes of this Order, privileged documents are those documents exempt from discovery from the United States in litigation under the Federal Rules of Civil Procedure. Respondent shall not assert as privileged any analytical, sampling and monitoring data.

#### **XI. RECORD PRESERVATION**

Respondent agrees that it shall preserve, during the pendency of this Order and for a minimum of six (6) years after its termination, all data, records and documents in its possession or in the possession of its divisions, officers, directors, employees, agents, contractors, successors, and assigns which relate in any way to this Order or to the management, disposal, and/or handling of hazardous waste at the Site. Six (6) years after the termination of this Order, Respondent shall notify EPA at least thirty (30) calendar days prior to the proposed destruction of any such records, and shall provide EPA with a reasonable opportunity to inspect, copy and/or take possession of any such records. EPA will then provide written notification to Respondent whether or not it wishes to inspect, copy or take possession of such documents. Respondent shall not destroy any records relating to this Order until notified by EPA, in accordance with this Section XI, that EPA does not wish to exercise the right to inspect, copy or take possession of such records from Respondent. Nothing in this Section XI shall in any way limit whatever authorities EPA may have under RCRA, CERCLA or any other law to obtain information from Respondent or any other person.

#### **XII. PROJECT COORDINATORS**

A. EPA hereby designates Deborah R. Goldblum as the EPA Project Coordinator. Within ten (10) calendar days of the effective date of the Consent Order, Respondent shall notify EPA, in writing, of the Project Coordinator it has selected. Respondent's legal counsel in this matter shall not serve as Respondent's Project Coordinator. Each Project Coordinator shall be responsible for overseeing the implementation of this Order. The EPA Project Coordinator will be EPA's primary designated representative at the Facility. To the maximum extent possible, all communications between Respondent and EPA, and all documents, reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order, shall be directed through the Project Coordinators.

B. Both parties shall provide at least seven (7) calendar days written notice to the other party prior to changing Project

Coordinators.

C. The absence of the EPA Project Coordinator from the Facility shall not be cause for the delay or stoppage of work.

**XIII. NOTIFICATION**

A. Unless otherwise specified, reports, correspondence, approvals, disapprovals, notices, or other submissions relating to or required under this Order shall be in writing and shall be sent as follows:

1. Four copies of all documents to be submitted to EPA shall be sent to:

Deborah R. Goldblum (3HW61)  
Project Manager/Geologist  
U. S. Environmental Protection Agency, Region III  
841 Chestnut Building  
Philadelphia, PA 19107  
215-597-6688

2. Documents to be submitted to Respondent shall be sent to:

William C. Farnum  
E.I. du Pont de Nemours & Co., Inc.  
Experimental Station Bldg. 268 Rm. 207  
Route 141  
Wilmington, Delaware 19880-0268  
302-695-3073

3. One copy of all documents to be submitted to EPA shall also be sent to:

Alex Rittberg  
Hazardous Waste Management Branch  
Delaware Department of Natural Resources and  
Environmental Control  
89 Kings Highway  
Dover, Delaware 19903  
302-739-3689

B. Any notice, report, certification, data presentation, or other document submitted by Respondent pursuant to this Order which discusses, describes, demonstrates, supports any finding or makes any representation concerning Respondent's compliance or noncompliance with any requirement of this Order shall be certified by a responsible corporate officer or a duly-authorized representative of a responsible corporate officer. A "responsible corporate officer" means: (a) a president, secretary, treasurer, or vice-president of the corporation in

charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or (b) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$35 million (in 1987 dollars when the Consumer Price Index was 345.3), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. A person is a "duly authorized representative" only if: (1) the authorization is made in writing by a person described above; (2) the authorization specifies either an individual or position having responsibility for overall operation of the regulated facility or activity (a duly authorized representative may thus be either a named individual or any individual occupying a named position); and (3) the written authorization is submitted to the EPA Project Coordinator designated in Section XII ("Project Coordinator") of this Order.

C. The certification required by paragraph B, above, shall be in the following form:

I certify under penalty of law that this [type of submission] and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, or the immediate supervisor of such person(s), the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Signature : \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

#### **XIV. DELAY IN PERFORMANCE/STIPULATED PENALTIES**

A. Subject to the provisions of this Consent Order, including, but not limited to, Section XV ("DISPUTE RESOLUTION"), Section XVI ("FORCE MAJEURE AND EXCUSABLE DELAY"), and Section XXII ("SUBSEQUENT MODIFICATION"), and in the event that Respondent fails to comply with any requirement set forth in paragraphs 1-5 below this Consent Order, Respondent shall pay stipulated penalties, as set forth below, upon receipt of written demand by EPA. Compliance by Respondent shall include commencement or completion of any activity, plan, study or report

required by this Consent Order in an acceptable manner and within the specified time schedules in and approved under this Consent Order. Stipulated penalties shall accrue as follows:

1. For failure to commence, perform or complete work as prescribed in this Consent Order: \$1,500 per day for one to seven days or part thereof of noncompliance, and \$5,000 per day for each day of noncompliance, or part thereof, thereafter;
2. For failure to submit the draft or final SAMR Plan or Monitoring Reports as required by this Consent Order: \$1,000 per day for one to fourteen days or part thereof of noncompliance, and \$4,000 per day for each day of noncompliance, or part thereof, thereafter;
3. For failure to submit other deliverables as required by this Consent Order: \$1,000 per day for one to seven days or part thereof of noncompliance, and \$2,000 per day for each day of noncompliance, or part thereof, thereafter;
4. For any failure to comply with the provisions of this Consent Order after receipt of notice of noncompliance by EPA: \$1,500 per day for one to seven days or part thereof of noncompliance, and \$3,000 per day for each day of noncompliance, or part thereof, in addition to any stipulated penalties imposed for the underlying noncompliance;
5. For any failure to comply with this Consent Order not described in subparagraphs 1 through 4, above: \$1,000 per day for one to seven days or part thereof of noncompliance, and \$1,500 per day for each day of noncompliance, or part thereof, thereafter.

B. All penalties shall begin to accrue on the date that complete performance is due or a violation occurs, and shall continue to accrue through the final day of or correction of the violation. Nothing herein shall prevent the simultaneous accrual of separate stipulated penalties for separate violations of this Consent Order. EPA may, in its sole discretion not subject to dispute resolution contained in Section XV below, impose a lesser or no penalty for violations of this Consent Order.

C. All penalties owed to EPA under this Section XIV shall be due within forty-five (45) calendar days of receipt of a demand for payment unless Respondent invokes the DISPUTE RESOLUTION procedures under Section XV, below. Such notification shall describe the noncompliance and shall indicate the amount of penalties due. Interest shall begin to accrue on the unpaid balance at the end of the thirty (30) calendar day period and shall accrue at the United States Tax and Loan Rate.

D. All penalty payments shall be made by certified or cashier's check payable to the "Treasurer of the United States of America" and shall be remitted to:

Regional Hearing Clerk  
U. S. Environmental Protection Agency, Region III  
P.O. Box 360515  
Pittsburgh, Pennsylvania 15251-6515

All payments shall reference the name of the Facility, the Respondent's name and address, and the EPA Docket Number of this Consent Order. Copies of the transmittal of payment shall be sent simultaneously to the EPA Project Coordinator and the Regional Hearing Clerk (3RC00), U.S. Environmental Protection Agency, Region III, 841 Chestnut Building, Philadelphia, Pennsylvania 19107.

E. Respondent may dispute EPA's demand for payment for any alleged violation of this Consent Order by invoking the dispute resolution procedures under Section XV, ("DISPUTE RESOLUTION"), below. Stipulated penalties shall continue to accrue, but need not be paid, for any alleged noncompliance which is the subject of Dispute Resolution during the period of such dispute resolution. To the extent that Respondent does not prevail upon resolution of the dispute, Respondent shall remit to EPA within seven (7) calendar days of receipt of such resolution any outstanding stipulated penalty payment in the manner described in Section XIV.D., above. This payment shall include any accrued interest, as calculated pursuant to paragraph C, above. To the extent Respondent prevails upon resolution of the dispute, no stipulated penalties nor interest for the alleged noncompliance which was the subject of the dispute shall be payable.

F. Neither the filing of a petition to resolve a dispute, nor the payment of penalties, shall alter in any way Respondent's obligation to comply with the requirements of this Consent Order.

G. The stipulated penalties set forth in this Section XIV shall not preclude EPA from pursuing any other remedies or sanctions which may be available to EPA by reason of Respondent's failure to comply with any of the requirements of this Consent Order. However, any and all stipulated penalties paid by Respondent shall be off-set against any and all civil penalties which are awarded to the United States from Respondent in any judicial or administrative proceeding for the same violation.

# XV. DISPUTE RESOLUTION

A. The parties to this Consent Order shall attempt to resolve expeditiously and informally any disagreements concerning implementation of this Consent Order or any work required hereunder. If the matter cannot be resolved informally and Respondent disagrees, in whole or in part, with any EPA disapproval, modification or other decision or directive made by EPA pursuant to this Consent Order, Respondent shall notify EPA in writing of its objections, and the basis therefor, within fourteen (14) calendar days of receipt of EPA's disapproval, decision, directive or other action. Such notice shall set forth the specific points of the dispute, the position which Respondent asserts should be adopted as consistent with the requirements of this Consent Order, the basis for Respondent's position, and any matters which it considers necessary for EPA's determination. Receipt by EPA of such notification shall constitute "initiation of Dispute Resolution procedures" for purposes of this Consent Order. EPA and Respondent shall have fourteen (14) calendar days from the initiation of Dispute Resolution procedures during which time representatives of EPA and Respondent may confer in person or by telephone to resolve the disagreement. If an agreement is reached, the resolution shall be written and signed by an authorized representative of each party. In the event that resolution is not reached within fourteen (14) calendar days of the initiation of the Dispute Resolution procedures, EPA will provide Respondent, in writing, its decision on the pending dispute. This decision by EPA will state the basis or rationale of the decision regarding the pending dispute. Receipt of such statement of decision by Respondent shall constitute "resolution" of the dispute as that term is used in this Consent Order, unless Respondent makes a written objection within seven (7) calendar days of receipt of the resolution. If a written objection is filed by the Respondent, the dispute shall be resolved by the appropriate EPA Region III supervisory official who shall render his or her decision in writing and submit it to Respondent.

B. The existence of a dispute, as defined in this Section XV, and EPA's consideration of matters placed into dispute, shall not excuse, toll or suspend any compliance obligation or deadline required pursuant to this Consent Order during the pendency of the dispute resolution process.

C. Notwithstanding any other provisions of this Consent Order, no action or decision by EPA, including, but without limitation to, decisions of the Regional Administrator, Region III, pursuant to this Consent Order, shall constitute final agency action giving rise to any right to judicial review prior to EPA's initiation of judicial action to compel Respondent's compliance with this Consent Order.

**XVI. FORCE MAJEURE AND EXCUSABLE DELAY**

A. Respondent shall perform the requirements of this Consent Order in the manner and within the time limits set forth herein, unless the performance is prevented or delayed by events or circumstances which constitute a force majeure. Respondent shall have the burden of proving such a force majeure. A force majeure is defined as any event arising from causes not reasonably foreseeable and beyond the control of Respondent, which cannot be overcome by due diligence and which delays or prevents performance in the manner and/or by the date required by this Consent Order. Such events do not include increased costs of performance, changed economic circumstances, reasonably foreseeable weather conditions or weather conditions which could have been overcome by due diligence, or failure to obtain Federal, State, or local permits, unless Respondent has made timely and complete application for such permits and exercised reasonable efforts to obtain such permits.

B. Respondent shall notify EPA, in writing, within seven (7) calendar days after it becomes or should have become aware of any event which Respondent claims constitutes a force majeure. Such notice shall estimate the anticipated length of delay, including necessary demobilization and remobilization, its cause, measures taken or to be taken to prevent or minimize the delay, and an estimated timetable for implementation of these measures. Failure to comply with the notice provision of this Section XV shall constitute a waiver of Respondent's right to assert a force majeure claim with respect to such event. In addition to the above notification requirements, Respondent shall undertake all reasonable actions to prevent or to minimize any delay in achieving compliance with any requirement of this Consent Order after it becomes or should have become aware of any event which may delay such compliance.

C. If EPA determines that the failure to comply or delay has been or will be caused by a force majeure event, the time for performance of that requirement of this Consent Order may be extended, upon EPA approval, for a period equal to the delay resulting from such circumstances. This shall be accomplished through an amendment to this Consent Order pursuant to Section XXII ("SUBSEQUENT MODIFICATION"). Such an extension shall not alter the schedule for performance or completion of any other tasks required by this Consent Order, unless these tasks are also specifically altered by amendment of the Consent Order.

D. In the event that EPA and Respondent cannot agree that any delay or failure has been or will be caused by a force majeure event, or if there is no agreement on the length of the extension, Respondent may invoke the dispute resolution procedures set forth in Section XV, ("DISPUTE RESOLUTION").

**XVII. RESERVATION OF RIGHTS**

A. EPA expressly reserves all rights and defenses that it may have, including the right both to disapprove of work performed by Respondent pursuant to this Order, to require that Respondent correct and/or re-perform any work disapproved by EPA, and to require that Respondent perform tasks in addition to those stated in the Scope(s) of Work or in this Order.

B. EPA hereby reserves all of its statutory and regulatory powers, authorities, rights and remedies, both legal and equitable, including any which may pertain to Respondent's failure to comply with any of the requirements of this Order, including, without limitation, the assessment of penalties under Section 3013(e) of RCRA, 42 U.S.C. Section 6934(e). This Order shall not be construed as a covenant not to sue, or as a release, waiver or limitation of any rights, remedies, powers and/or authorities, civil or criminal, which EPA has under RCRA, CERCLA, or any other statutory, regulatory or common law authority of the United States.

C. Compliance by Respondent with the terms of this Order shall not relieve Respondent of its obligations to comply with RCRA or any other applicable local, state, or federal laws and/or regulations.

D. The signing of this Consent Order and Respondent's compliance with this Order shall not limit or otherwise preclude EPA from taking additional enforcement action pursuant to Section 3013 of RCRA, 42 U.S.C. Section 6934, or any other legal authority, should EPA determine that such action is warranted.

E. This Order is not intended to be, nor shall it be construed as, a permit. This Order does not relieve Respondent of any obligation to obtain and comply with any local, state, or federal permit(s) or approval.

F. EPA reserves the right to perform any portion of the work required herein or any additional monitoring, sampling, analysis, or reporting, site characterization, remedial investigation, feasibility study, and response/corrective actions it deems necessary to protect public health or welfare or the environment. EPA may exercise its authority under RCRA, CERCLA or any other authority to undertake or require the performance of response actions at any time. EPA also reserves the right to seek reimbursement from Respondent for costs incurred by the United States in connection with any such response actions. Notwithstanding compliance with the terms of this Consent Order, Respondent is not released from liability, if any, for the costs of any response actions taken or authorized by EPA.

G. EPA reserves whatever rights it may have under CERCLA or any other law, or in equity, to recover from Respondent any

costs incurred by EPA in overseeing the implementation of this Consent Order.

H. If EPA determines that conditions or activities at the Facility, whether or not in compliance with this Order, have caused or may cause a release or threatened release of hazardous wastes, hazardous constituents, hazardous substances, pollutants or contaminants which threaten or may pose a threat to the public health or welfare or to the environment, EPA may direct that Respondent stop further implementation of this Order for such period of time as may be needed to abate any such release or threatened release and/or to undertake any action which EPA determines is necessary to abate such release or threatened release.

#### XVIII. OTHER CLAIMS

Nothing in this Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person, firm, partnership, or corporation, or other entity for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous constituents, hazardous substances, hazardous wastes, pollutants, or contaminants found at, taken to, or taken from the Facility.

#### XIX. OTHER APPLICABLE LAWS

All actions required to be taken pursuant to this Order shall be undertaken in accordance with the requirements of all applicable local, state, and federal laws and regulations. Respondent shall obtain or require its authorized representatives to obtain all permits and approvals necessary under such laws and regulations.

#### XX. INDEMNIFICATION OF THE UNITED STATES GOVERNMENT

Respondent agrees to indemnify and save and hold harmless the United States Government, its agencies, departments, agents, and employees, from any and all claims or causes of action arising from or on account of acts or omissions of Respondent or its agents, independent contractors, receivers, trustees, and assigns in carrying out activities required by this Order. This indemnification shall not be construed in any way as affecting or limiting the rights or obligations of Respondent or the United States under their various contracts. The United States shall not be deemed to be a party to any contract entered into by Respondent for the purpose of carrying out any activities required by this Order.

**XXI. NOTICE OF NON-LIABILITY OF EPA**

EPA shall not be deemed a party to any contract involving Respondent and relating to activities at the Facility and shall not be liable for any claim or cause of action arising from or on account of any act, or the omission of Respondent, its officers, employees, contractors, receivers, trustees, agents or assigns, in carrying out the activities required by this Consent Order.

**XXII. SUBSEQUENT MODIFICATION**

A. Except as provided in paragraph C of this Section XXII, below, this Consent Order may be amended only by mutual agreement of EPA and Respondent. Any such amendment shall be in writing, shall be signed by an authorized representative of each party, shall have as its effective date the date on which it is received by Respondent's Project Coordinator, and shall be incorporated into this Consent Order. Any oral agreement between EPA and Respondent, the purpose of which is to modify this Consent Order to address exigent circumstances, and which is subsequently ratified in writing by EPA and Respondent, shall have as its effective date the date it is received by Respondent's Project Coordinator. Any request by Respondent for modification of this Order whether by amendment or minor modification, shall be accompanied by a statement from Respondent of how such modification shall effect the Workplan schedule.

B. Any reports, plans, specifications, schedules, other submissions and attachments required by this Consent Order are, upon written approval by EPA, incorporated into this Consent Order. Any noncompliance with such EPA-approved reports, plans, specifications, schedules, and attachments shall be considered a violation of this Consent Order and shall subject Respondent to the stipulated penalty provisions included in Section XIV, ("DELAY IN PERFORMANCE/STIPULATED PENALTIES").

C. Minor modifications in the studies, techniques, procedures, designs or schedules utilized in carrying out this Consent Order and necessary for the completion of the project may be made by written agreement of the Project Coordinators. Such modifications shall have as an effective date the date on which the agreement is received by Respondent's Project Coordinator after signing by EPA Project Coordinator.

D. No informal advice, guidance, suggestions, or comments by EPA regarding reports, plans, specifications, schedules, and any other writing submitted by Respondent shall be construed as relieving Respondent of its obligation to obtain written approval, if and when required by this Consent Order.

**XXIII. SEVERABILITY**

If any provision or authority of this Consent Order or the application of this Consent Order to any party or circumstance is held by any judicial or administrative authority to be invalid, the application of such provision to other parties or circumstances and the remainder of this Consent Order shall not be affected thereby and shall remain in full force.

**XXIV. TERMINATION AND SATISFACTION**

The provisions of this Consent Order shall be deemed satisfied upon Respondent's receipt of written notice from EPA that Respondent has demonstrated, to the satisfaction of EPA, that the terms of this Consent Order, including any additional tasks determined by EPA to be required pursuant to this Consent Order, have been satisfactorily completed. This notice shall not, however, terminate Respondent's obligation to comply with any continuing obligations hereunder including, but not limited to, Sections XI ("RECORD PRESERVATION"), XVII ("RESERVATION OF RIGHTS"), XVIII ("OTHER CLAIMS"), XIX ("OTHER APPLICABLE LAWS"), XX ("INDEMNIFICATION OF THE UNITED STATES GOVERNMENT") and XXI ("NOTICE OF NON-LIABILITY OF EPA").

**XXV. ATTORNEY'S FEES**

The Respondent shall bear its own costs and attorney's fees.

**XXVI. NO ADMISSION OF LIABILITY**

The participation of Respondent in this Consent Order shall not be considered an admission for any purpose in any proceeding and the fact of such participation shall not be admissible as evidence against Respondent in any proceeding to enforce this Consent Order or in any action brought by Respondent to enforce any contractual obligation imposed by any agreement between Respondent and its contractor(s).

**XXVII. EFFECTIVE DATE**

The effective date of this Consent Order shall be the date on which a fully executed true and correct copy of this Consent Order is received by Respondent.

IT IS SO AGREED AND ORDERED:

DATE: 9-30-93

BY: Stanley L. Laskowski  
STANLEY L. LASKOWSKI  
*for* ACTING REGIONAL ADMINISTRATOR  
UNITED STATES ENVIRONMENTAL  
PROTECTION AGENCY, REGION III

DATE: September 28, 1993

BY: William L. Porter  
WILLIAM L. PORTER  
ENVIRONMENTAL MANAGER  
DUPONT FACILITY SERVICES  
E. I. DUPONT DE NEMOURS & CO. *W.L.P.*

ATTACHMENT BSCOPE OF WORK FOR A  
HEALTH AND SAFETY PLAN

The Respondent shall prepare a facility Health and Safety Plan.

1. Major elements of the Health and Safety Plan shall include:
  - a. Facility description including availability of resources such as roads, water supply, electricity, and telephone service;
  - b. Description of the known hazards and evaluations of the risks associated with the incident and with each activity conducted, including, but not limited to on and off-site exposure to contaminants;
  - c. List of key personnel and alternates responsible for site safety, response operations, and for protection of public health;
  - d. Delineation of work area;
  - e. Description of levels of protection to be worn by personnel in work area;
  - f. Establishment of procedures to control site access;
  - g. Description of decontamination procedures for personnel and equipment;
  - h. Establishment of site emergency procedures;
  - i. Emergency medical care for injuries and toxicological problems;
  - j. Description of requirements for an environmental surveillance program;
  - k. Routine and special training required for responders; and
  - l. Establishment of procedures for protecting workers from weather-related problems.
2. The Facility Health and Safety Plan shall be consistent with:
  - a. NIOSH Occupational Safety and Health Guidance Manual

for Hazardous Waste Site Activities (1985);

- b. EPA Order 1440.3 - Respiratory Protection;
  - c. EPA Order 1440.2 - Health and Safety Requirements for Employees engaged in Field Activities;
  - d. Facility Contingency Plan;
  - e. EPA Standard Operating Safety Guide (1984);
  - f. OSHA regulations particularly in 29 C.F.R. § § 1910 and § 1926;
  - g. State and local regulations; and
  - h. Other EPA guidance as provided.
3. The Health and Safety Plan must be revised to address any additions and/or changes in planned activities.

## ATTACHMENT C

### **SCOPE OF WORK FOR A WASTE MINIMIZATION PROGRAM**

#### SCOPE

The Waste Minimization Program consists of two tasks:

#### **TASK I. MANAGEMENT INITIATIVES PROGRAM**

- A. Employee Training
- B. Incentives
- C. Waste Audits

#### **TASK II. WASTE MINIMIZATION OPTIONS PROGRAM**

- A. Reduction Options
- B. Recycling Options
- C. Treatment Options
- D. Waste Exchange Options

#### **TASK I. MANAGEMENT INITIATIVES PROGRAM**

The objective of this program will be to encourage employees to strive conscientiously to reduce waste. This program shall consist of the following:

##### **A. Employee Training**

Training shall be developed and implemented to increase employee awareness of operating practices that reduce both solid and hazardous waste generation. A training program shall include:

1. Occupational health and plant safety;
2. Company regulatory compliance requirements; and
3. A statement of the company's approach to waste minimization and/or its waste minimization plan.

##### **B. Incentives**

An incentive program shall be developed and implemented to provide motivation and to boost employees cooperation and participation in waste minimization. This incentive program shall include:

1. Providing incentives for the development of useful waste minimization ideas;
2. Providing recognition and financial awards for outstanding waste minimization programs, practices, and/or suggestions; and

3. Implementing or revising the operational supervisory structure and/or management procedures.

C. Waste Audits

A program of waste audits shall be developed and implemented to provide a systematic and periodic survey of the company's operations designed to identify areas of potential waste reduction. This program shall include:

1. Identification of hazardous substances in waste and the sources of these substances;
2. Prioritization of various waste reduction actions to be undertaken;
3. Evaluation of some technically, economically, and ecologically feasible approaches to waste minimization;
4. Development of an economic comparison of waste minimization and waste management options; and
5. Evaluation of waste minimization modification results.

**TASK II. WASTE MINIMIZATION OPTIONS PROGRAM**

This program shall be developed to investigate, evaluate and recommend waste minimization options. This program shall include a step-by-step analysis of waste reduction options, recycling options, and finally, only after acceptable waste minimization techniques have been investigated and evaluated, waste treatment options.

A. Reduction Options

These options shall be characterized as good operating practices (also known as good housekeeping practices), material substitutions, and technology changes. These techniques avoid the generation of hazardous waste, thereby eliminating the problems associated with handling these waste.

1. **Good operating practices;**

These practices involve the procedural or organizational aspects of a manufacturing process and, in some areas, changes in operating practices, in order to reduce the amount of waste generated. These practices would include, at a minimum, the following elements:

- a. Material handling improvements;
- b. Scheduling improvements;
- c. Spill and leak prevention;

- d. Preventive maintenance;
- e. Corrective maintenance;
- f. Material/waste tracking or inventory control;
- g. Communication documentation; and
- h. Waste stream segregation according to toxicity, type of contaminant, and physical state.

2. Material substitution practices;

The purpose of these practices is to find substitute process/manufacturing materials which are less hazardous than those currently utilized and which result in the generation of waste in smaller quantities and/or of less toxicity.

3. Technological modification practices;

These practices shall be oriented toward process and equipment modification to reduce waste, primarily in a production setting. These practices can range from changes that can be implemented in a matter of days at low cost to the replacement of processes involving large capital cost. These modifications include changes in the following:

- a. Processes;
- b. Equipment;
- c. Process automation;
- d. Operation settings, including, but not limited to, flow rates, temperatures, pressures, and/or residence times;
- e. Water conservation; and
- f. Energy conservation.

B. Recycling Options

These options are characterized as use/reuse and resource recovery techniques.

1. Use and reuse practices;

~~These~~ practices involve the return of a waste material either to the originating process or to another process as a substitute for an input material.

2. Reclamation practices;

These practices differ from the use and reuse practices in that the recovered material is not used in the facility, but is sold to another company.

C. Treatment Options

These options shall be oriented to the changes of the physical, chemical, or biological character of any hazardous waste in order to reduce the toxicity and the volume to render such waste more available for storage and safer to manage.

D. Waste Exchange Options

These options are attempts to match the waste from one business with the raw material requirements of another business, thereby finding a market for what one business sees as a waste but what another business sees as a material.

**ATTACHMENT D****SCOPE OF WORK  
FOR AN INTERIM MEASURES PLAN****PURPOSE**

This Statement of Work ("SOW") sets forth the requirements for implementation of Interim Measures pursuant to the Final Administrative Order on Consent ("Order") to which this SOW is attached. The purpose of Interim Measures are to identify and correct any actual or potential releases of hazardous waste or constituents from regulated units, solid waste management units, and other sources or areas at the Facility which may present an endangerment to human health or the environment.

**SCOPE****Task I. INTERIM MEASURES WORKPLAN**

- A. Interim Measures  
Project Management Plan
- B. Data Collection Quality Assurance Plan
- C. Data Management Plan

**Task II. INTERIM MEASURES DESIGN**

- A. Design Plans and Specifications
- B. Operations and Maintenance Plan
- C. Project Schedule
- D. Final Design Documents

**Task III. INTERIM MEASURES CONSTRUCTION**

- A. Construction Quality Assurance Plan
- B. Construction Implementation
- ~~C. Inspection Activities~~

**Task IV. REPORTS**

- A. Progress
- B. Interim Measures Workplan
- C. Revisions to QAPP
- D. Interim Measures Design Documents
- E. Interim Measures Operation & Maintenance Plan
- F. Interim Measures Report

**TASK I: INTERIM MEASURES WORKPLAN**

Respondent shall prepare an Interim Measures Workplan. The Workplan shall specify the objectives of the interim measures, demonstrate how the interim measures will abate releases and threatened releases, and, to the extent possible, be consistent and integrated with any long term solution at the Facility. The Workplan shall include the development of the following plans which shall be prepared concurrently:

**A. Interim Measures Project Management Plan**

The Interim Measures Project Management Plan will include a discussion of the technical approach, engineering design, engineering plans, schedules, budget, and personnel. Respondent shall specifically identify dates for completion of the project and major interim milestones which are enforceable terms of this order. The Interim Measures Project Management Plan also will include a description of qualifications of personnel performing or directing the interim measures, including contractor personnel. Finally, this plan shall document the overall management approach to the interim measures.

**B. Data Collection Quality Assurance Plan**

The Respondent shall prepare and Interim Measures Data Collection Quality Assurance Plan as part of the Quality Assurance Plan (QAPP) to be submitted pursuant to Attachment A of this Order to document all monitoring procedures including sampling, field measurements and sample analysis performed during the investigation to characterize the source and contamination. The Interim Measures Data Collection Quality Assurance Plan shall ensure that all information, data and resulting decisions regarding Interim Measures are technically sound, statistically valid, and properly documented.

**1. Data Collection Strategy**

The strategy section of the Interim Measures Data Collection Quality Assurance Plan shall include, but not be limited to, the following:

- a. Description of the intended uses for the data collected as part of Interim Measures, and the necessary level of precision and accuracy for these intended uses;

- b. Description of methods and procedures to be used as part of Interim Measures to assess the precision, accuracy and completeness of the measurement data;
- c. Description of the rationale used to assure that the data used as part of Interim Measures accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition or an environmental condition. Examples of factors which shall be considered and discussed include:
  - i) Environmental conditions at the time of sampling;
  - ii) Number of sampling points;
  - iii) Representativeness of selected media; and
  - iv) Representativeness of selected analytical parameters.
- d. Description of the measures to be taken as part of Interim Measures to assure that the following data sets can be compared to each other:
  - i) Data generated by the Respondent over some time period;
  - ii) Data generated by an outside laboratory or consultant versus data generated by the Respondent;
  - iii) Data generated by separate consultants or laboratories; and
  - iv) Data generated by an outside consultant or laboratory over some time period.
- e. Details relating to the Interim Measures schedule outlined in the Interim Measures Project Management Plan and information to be provided in quality assurance reports. The reports should include, but not be limited to the following, as related to Interim Measures:
  - i) Periodic assessment of measurement data accuracy, precision, and completeness;

- ii) Results of performance audits;
- iii) Results of system audits;
- iv) Significant quality assurance problems and recommended solutions; and
- v) Resolutions of previously stated problems.

## 2. Sampling and Field Measurements

The Sampling and Field Measurements section of the Interim Measures Data Collection Quality Assurance Plan shall discuss the following as related to Interim Measures:

- a. Selecting appropriate sampling and field measurement locations, depths, etc.;
- b. Providing a statistically sufficient number of Sampling and field measurement sites;
- c. Measuring all necessary ancillary data;
- d. Determining which media are to be sampled, (e.g., ground water, soil, sediment, etc.);
- e. Determining which parameters are to be measured and where;
- f. Frequency of sampling and field measurement and length of sampling period;
- g. Types of sample (e.g., composites vs. grabs) and number of samples to be collected;
- h. Documenting field sampling and field measurement operations and procedures, including;
  - i) Documentation of procedures for preparation of reagents or supplies which become an integral part of the sample (e.g., filters, and adsorbing reagents);
  - ii) Procedures and forms for recording the exact location and specific considerations associated with sample and field measurement data acquisition;
  - iii) Documentation of specific sample

preservation method;

- iv) Calibration of field devices;
  - v) Collection of replicate samples;
  - vi) Submission of field-biased blanks, where appropriate;
  - vii) Potential interferences present at the facility;
  - viii) Construction materials and techniques, associated with monitoring wells and piezometers;
  - ix) Field equipment listing and sample containers;
  - x) Sampling and field measurement order; and
  - xi) Decontamination procedures.
- i. Selecting appropriate sample containers;
  - j. Sample preservation; and
  - k. Chain-of-custody, including:
    - i) Standardized field tracking reporting forms to establish sample custody in the field prior to shipment; and
    - ii) Pre-prepared sample labels containing all information necessary for effective sample tracking.

### **3. Sample Analysis**

The Sample Analysis section of the Interim Measures Data Collection Quality Assurance Plan shall specify the following as related to Interim Measures:

- a. Chain-of-custody procedures, including:
  - i) Identification of a responsible party to act as sample custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;

- ii) Provision for a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and
  - iii) Specification of laboratory sample custody procedures for sample handling, storage, and dispersement for analysis.
- b. Sample storage and holding times;
  - c. Sample preparation methods;
  - d. Analytical procedures, including:
    - i) Scope and application of the procedure;
    - ii) Sample matrix;
    - iii) Potential interferences;
    - iv) Precision and accuracy of the methodology; and
    - v) Method detection limits.
  - e. Calibration procedures and frequency;
  - f. Data reduction, validation and reporting;
  - g. Internal quality control checks, laboratory performance and systems audits and frequency, including:
    - i) Method blank(s);
    - ii) Laboratory control sample(s);
    - iii) Calibration check sample(s);
    - iv) Replicate sample(s);
    - v) Matrix-spiked sample(s);
    - vi) "Blind" quality control sample(s);
    - vii) Control charts;
    - viii) Surrogate samples;
    - ix) Zero and span gases; and
    - x) Reagent quality control checks.

- h. Preventive maintenance procedures and schedules;
- i. Corrective action (for laboratory problems); and
- j. Turnaround time.

A performance audit may be conducted by EPA on the laboratories selected by the Respondent.

C. Interim Measures Data Management Plan

The Respondent shall develop and initiate an Interim Measures Data Management Plan as part of the Data Management Plan described in Attachment D of this Order to document and track investigation data and results. This plan shall identify data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions related to Interim Measures in the Interim Measures Design Documents and Interim Measures Report.

1. Data Record

The data record shall include the following:

- a. Unique sample or field measurement code;
- b. Sampling or field measurement location and sample or measurement type;
- c. Sampling or field measurement raw data;
- d. Laboratory analysis ID number;
- e. Property or component measured; and
- f. Result of analysis (e.g., concentration).

2. Tabular Displays

The following data shall be available to EPA on a disc compatible with EPA's personal computers and presented in tabular displays:

- a. Unsorted (raw) data;
- b. Results for each medium, or for each

constituent monitored;

- c. Data reduction for numerical analysis;
- d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and
- e. Summary data.

### 3. Graphical Displays

The following data shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

- a. Sampling location and sampling grid;
- b. Boundaries of sampling area, and areas where more data are required;
- c. Levels of contamination at each sampling location;
- d. Geographical extent of contamination;
- e. Contamination levels, averages, and maxima;
- f. Changes in concentration in relation to distance from the source, time, depth or other parameters; and
- g. Features affecting intramedia transport and potential receptors.

## **TASK II: INTERIM MEASURES DESIGN**

### **A. Design Plans and Specifications**

Respondent shall develop clear and comprehensive design plans and specifications which include but are not limited to the following:

- 1. Discussion of the design strategy and the design basis, including:
  - a. Compliance with all applicable or relevant environmental and public health standards; and
  - b. Minimization of environmental and public impacts.

- c. Use of currently accepted environmental control measures and technology;
  - d. The constructability of the design; and
  - e. Use of currently acceptable construction practices and techniques.
- 2. Description of assumptions made and detailed justification of these assumptions.
- 3. Discussion of the possible sources of error and references to possible operation and maintenance problems.
- 4. Detailed drawings of the proposed design including;
  - a. Qualitative flow sheets;
  - b. Quantitative flow sheets;
  - c. Facility Layouts;
  - d. Utility Locations.
- 5. Tables listing materials, equipment, and specifications.
- 6. Tables giving material balances.
- 7. Appendices including:
  - a. Sample calculations (one example presented and explained clearly for a significant or unique design calculations);
  - b. Derivation of equations essential to understanding the report; and
  - c. Results of laboratory or field tests.

Before submitting the project specifications, Respondent shall coordinate and cross-check the specifications and drawings and complete the proofing of the edited specifications to ensure that drawings and specifications are correlated.

**B. Interim Measures Operation and Maintenance Plan**

Respondent shall prepare an Interim Measures Operation and Maintenance Plan to cover both implementation and

long-term maintenance of the interim measure(s). The plan shall be composed of the following elements:

1. Equipment start-up and operator training. Respondent shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experience personnel to supervise the installation, adjustment, start-up and operation of the treatment systems, and training covering appropriate operational procedures once the start up has been successfully accomplished.
2. Description of normal operation and maintenance (O&M):
  - a. Description of tasks for operation;
  - b. Description of tasks for maintenance;
  - c. Description of prescribed treatment or operation conditions; and
  - d. Schedule showing frequency of each O&M task;
  - e. Common and/or anticipated remedies.
3. Description of routine monitoring and laboratory testing:
  - a. Description of monitoring tasks;
  - b. Description of required laboratory tests and their interpretation;
  - c. Required QA/QC; and
  - — d. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.
4. Description of equipment:
  - a. Equipment identification;
  - b. Installation of monitoring components;
  - c. Maintenance of site equipment; and
  - d. Replacement schedule for equipment and installed components.

5. Records and reporting mechanisms required.
  - a. Daily operating logs;
  - b. Laboratory records;
  - c. Mechanism for reporting emergencies;
  - d. Personnel and maintenance records; and
  - e. Monthly/annual reports to Federal/State agencies.

The Interim Measures Operation and Maintenance Plan shall be submitted with the Final Interim Measures Design Documents.

C. Project Schedule

Respondent shall revise the detailed Project Schedule in the Interim Measures Project Management Plan to address construction and implementation of the interim measure(s). A revised Project Schedule shall be submitted simultaneously with the Final Design Documents.

D. Interim Measure Final Design Documents

The Final Design Documents shall consist of the Final Design Plans and Specifications (100% complete), the Final Draft Operation and Maintenance Plan, and project schedule revision in the Interim Measures Project Management Plan. Respondent shall submit the final documents with reproducible drawings and reproducible drawings and specifications. The quality of the design documents shall be such that Respondent would be able to include them in a bid package and invite contractors to submit bids for the construction project.

**TASK III: INTERIM MEASURE CONSTRUCTION**

A. Interim Measure Construction Quality Assurance Plan

Respondent shall revise the QAPP, to be submitted pursuant to Attachment A of this Order, to identify and document the objectives and framework for the development of an interim measures construction quality assurance program. The Interim Measure Construction of the QAPP ("IMCQA Plan") shall include, but not be limited to, the following: personnel qualifications; inspection activities; sampling requirements; documentation; responsibility and authority of all organizations (i.e., technical consultants, construction firms, etc.) and key personnel involved in

the construction of the interim measure. Reporting requirements for CQA activities shall be described in detail in CQA plan. This plan shall include such items as daily summary reports, inspection data sheets, problem identification and interim measures reports, design acceptance reports, and final documentation. Provisions for the final storage of all records shall be presented in the CQA plan. The QAPP shall identify a CQA officer and the necessary supporting inspection staff.

**B. Construction Implementation**

Following EPA approval of the Interim Measure Final Design Documents and IMCQA Plan, the Respondent shall implement construction in accordance with procedures, specifications, and schedules in the EPA-approved Interim Measures Design Documents Interim Measures Project Management Plan, and Construction Quality Assurance (CQA) Plan

**C. Inspection Activities**

The observations and tests that will be used to monitor the construction and/or installation of the components of the interim measure(s) shall be summarized in the IMCQA Plan. The IMCQA Plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with all environmental requirements and include, but not be limited to air quality and emissions monitoring records, waste disposal records (e.g., RCRA transportation manifests), etc. The inspection should also ensure compliance with all health and safety procedures. In addition to oversight inspections, Respondent shall conduct the following activities:

1. **Preconstruction inspection and meeting**  
Respondent shall conduct a preconstruction inspection and meeting to:
  - a. Review methods for documenting and reporting inspection data;
  - b. Review methods for distributing and storing documents and reports;
  - c. Review work area security and safety protocol;
  - d. Discuss any appropriate modifications of the construction quality assurance plan to ensure

that site-specific considerations are addressed; and

- e. Conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person and minutes should be transmitted to all parties.

- 2. Respondent will conduct inspections to monitor the constructions and/or installation of components of the corrective measure. Inspections shall verify compliance with all environmental requirements and include, but not be limited to, review of air quality and emissions monitoring records, waster disposal records (e.g., RCRA transportation manifests), etc. Inspections will also ensure compliance with all health and safety procedures. Treatment equipment will be operationally tested by the Respondent. The Respondent will certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting will be completed where deficiencies are revealed.

#### **TASK IV: REPORTS**

##### **A. Progress**

Respondent shall provide the EPA with signed, bimonthly progress reports containing:

- 1. A description and estimate of the percentage of the interim measures completed;
- 2. Summaries of all findings;
- 3. Summaries of all changes made in the interim measures during the reporting period;
- 4. Summaries of all contacts with representative of the local community, public interest groups, or State government during the reporting period;
- 5. Summaries of all problems or potential problems encountered during the reporting period;
- 6. Actions being taken to rectify problems;

7. Changes in personnel during the reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. Interim Measures Workplan

Respondent shall submit an Interim Measures Workplan as described in this Attachment. Respondent shall submit revisions to the Interim Measures Project Management Plan to depict changes in the Project Schedule.

C. Revisions to QAPP

Respondent shall submit revisions to the QAPP, described in Attachment A to the Order, as described in this Attachment.

D. Interim Measure Design Documents

Respondent shall submit the Design Documents as described in this Attachment.

E. Interim Measures Operation and Maintenance Plan

Respondent shall submit an Interim Measures Operation and Maintenance Plan as described in this Attachment.

F. Interim Measures Report

At the completion of the construction of the project (except for long term operation, maintenance, and monitoring), Respondent shall submit a draft Interim Measures Implementation Report to EPA. The Report shall document that the project is consistent with the design specifications, and that the interim measures are performing adequately. The Report shall include, but not be limited to the following elements:

1. Synopsis of the interim measures and certification of the design and construction;
2. Explanation of any modifications to the plans and why these were necessary for the project;
3. Listing of the criteria, established before the interim measures were initiated, for judging the functioning of the interim measures and also explaining any modification to these criteria;
4. Results of facility monitoring, indicating that the interim measures will meet or exceed the performance criteria; and

5. Explanation of the operation and maintenance (including monitoring) to be undertaken at the facility.

This report shall include of the inspection summary reports, inspection data sheets, problem identification and corrective reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications (with justifying documentation) and as-built drawings.

Respondent shall finalize the Interim Measures Work Plan and the Interim Measures Implementation Report incorporating comments received on draft submissions.

## **ATTACHMENT E**

### **STUDY OF ALTERNATIVES SCOPE OF WORK**

#### **PURPOSE**

The purpose of this Study of Alternative (SOA) is to develop and evaluate the corrective action alternative or alternatives and to recommend the corrective measure or measures to be taken at the Site. The Respondent shall furnish the personnel, materials, and services necessary to prepare the Study of Alternatives, except as otherwise specified.

#### **SCOPE**

The Study of Alternatives consists of four tasks:

#### **TASK I: IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE MEASURES ALTERNATIVE OR ALTERNATIVES**

- A. Description of Current Situation
- B. Establishment of Corrective Action Objectives
- C. Screening of Corrective Measures Technologies
- D. Identification of the Corrective Measures Alternative or Alternatives

#### **TASK II: EVALUATION OF THE CORRECTIVE MEASURES ALTERNATIVE OR ALTERNATIVES**

- A. Technical/Environmental/Human Health/Institutional
- B. Cost Estimate
- C. Waste Minimization Plan

#### **TASK III: JUSTIFICATION AND RECOMMENDATION OF THE CORRECTIVE MEASURE OR MEASURES**

- A. Technical
- B. Human Health
- ~~C.~~ -Environmental

#### **TASK IV: REPORTS**

- A. Progress
- B. Draft
- C. Final

**TASK I: IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE ACTION ALTERNATIVE OR ALTERNATIVES**

Based on the results of the Sampling, Analysis, Monitoring and Reporting ("SAMR") Program and considering the Corrective Measures Study ("CMS") submitted in July of 1991, Respondent shall identify, screen, and develop the alternative or alternatives for removal, containment, treatment, and/or other remediation of the contamination based on the objectives established for the corrective action.

**A. Description of Current Situation**

Respondent shall submit an update to the information describing the current situation at the facility and the known nature and extent of the contamination as documented by the RCRA Facility Investigation Report. Respondent shall provide an update to information presented in Task I of the RCRA Facility Investigation, "DESCRIPTION OF CURRENT CONDITIONS," to the Agency regarding previous response activities and any interim measures which have or are being implemented at the facility. Respondent shall also make a facility-specific statement of the purpose for the response, based on the results of the SAMR Program. The statement of purpose should identify the actual or potential exposure pathways that should be addressed by corrective measures.

**B. Establishment of Corrective Action Objectives**

Respondent, in conjunction with the EPA, shall establish site specific objectives for the corrective action. These objectives shall be based on public health and environmental criteria, information gathered during the RCRA Facility Investigation and the SAMR Program, EPA guidance, and the requirements of any applicable Federal statutes. At a minimum, all corrective actions concerning ground water releases from regulated units must be consistent with, and as stringent as, those required under 40 C.F.R. 264.100.

**C. Screening of Corrective Measures Technologies**

~~Respondent~~ shall review the results of the RCRA Facility Investigation and the SAMR Program and reassess the technologies identified in the CMS report as approved by EPA and identify additional technologies which are applicable at the facility. Respondent shall screen the preliminary corrective measures technologies identified in CMS and any supplemental technologies to eliminate those that may prove infeasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that do not achieve the corrective measures objective within a reasonable time period. This screening process focuses on eliminating those technologies which have severe limitations for a given set of waste and site-specific conditions. The

screening step may also eliminate technologies based on inherent technology limitations. Site, waste, and technology characteristics which are used to screen inapplicable technologies are described in more detail below:

1. Site Characteristics

Site data should be reviewed to identify conditions that may limit or promote the use of certain technologies. The use of technologies which are clearly precluded by site characteristics should be eliminated from further consideration.

2. Waste Characteristics

Waste characteristics particularly affect the feasibility of remediating waste by utilizing in-situ methods, direct treatment methods, or land disposal (on-/off-site) methods. Therefore, identification of waste characteristics that limit the effectiveness or feasibility of remediating technologies is an important part of the screening process. Remediating technologies clearly limited by these waste characteristics should be eliminated from consideration.

3. Technology Limitations

During the screening process, the level of technological development, performance record, and inherent construction, operation, and maintenance problems should be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

D. Identification of the Corrective Measures Alternative or Alternatives

Respondent shall develop the corrective measures alternative or alternatives based on the corrective action objectives and analysis of Corrective Measures Study and with the supplemented data collected during the SAMR Program. Respondent shall rely on engineering practice to determine which of the previously identified technologies appear most suitable for the site. Technologies can be combined to form the overall corrective action alternative or alternatives. The alternative or alternatives developed should represent a

workable number of option(s) that each appear to address adequately all site problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. Respondent shall document the reasons for excluding technologies, identified in Task II, as supplemented in the development of the alternative or alternatives.

**TASK II: EVALUATION OF THE CORRECTIVE MEASURES ALTERNATIVE OR ALTERNATIVES**

Respondent shall describe each corrective measures alternative that passes through the initial screening in Task I and evaluate each corrective measures alternative and its components. The evaluation shall be based on technical, environmental, human health, and institutional concerns. Respondent shall also develop cost estimates of each corrective measure.

**A. Technical/Environmental/Human Health/Institutional**

The Respondent shall provide a description of each corrective measures alternative which includes, but is not limited to, the following: preliminary process flow sheets; preliminary sizing and type of construction for buildings and structures; and rough quantities of utilities required. Respondent shall evaluate each alternative in the following four areas:

**1. Technical**

Respondent shall evaluate each corrective measure alternative based on performance, reliability, implementability, and safety.

**a. Respondent shall evaluate performance based on the effectiveness and useful life of the corrective measures, described below:**

- i) Effectiveness shall be evaluated in terms of the ability to perform intended functions, such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure shall be determined either through design specifications or by performance evaluation. Any specific waste or site characteristics which could potentially impede effectiveness shall be considered. The evaluation should also consider the effectiveness of combinations of technologies; and**

ii) Useful life is defined as the length of time the level of effectiveness can be maintained. Most corrective measures technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure shall be evaluated in terms of the projected service lives of its component technologies. Resource availability in the future life of the technologies, as well as appropriateness of the technologies, must be considered in estimating the useful life of the project.

b. Respondent shall provide information on the reliability of each corrective measure, including their operation and maintenance requirements and their demonstrated reliability, described below:

i) Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities should be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements shall also be considered; and

ii) Demonstrated and expected reliability is a way of measuring the risk and effect of failure. Respondent should evaluate whether the technologies have been used effectively under analogous conditions; whether the combination of technologies has been used effectively; whether failure of any one technology has an immediate impact on receptors; and whether the corrective measure has the

flexibility to deal with uncontrollable changes at the site.

- c. Respondent shall describe the implementability of each corrective measure, including the relative ease of installation (constructability) and the time required to achieve a given level of response, described below:

i) Constructability is determined by conditions both internal and external to the facility conditions and includes such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and location of the facility (i.e., remote location vs. a congested urban area). Respondent shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities; and

ii) Time has two components that shall be addressed: the time it takes to implement a corrective measure and the time it takes to actually obtain beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.

- d. Respondent shall evaluate each corrective measures alternative with regard to safety. This evaluation shall include threats to the safety of nearby communities and environments, as well as to the safety of workers during implementation. Factors to consider include, but are not limited to, fire, explosion, and exposure to hazardous substances.

## 2. Environmental

Respondent shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on the facility conditions and pathways of contamination actually addressed by each alternative. The Environmental Assessment for each alternative will

include, at a minimum, an evaluation of: the short- and long-term beneficial and adverse effects of the response alternative; any adverse effects on environmentally sensitive areas; and an analysis of measures to mitigate adverse effects.

3. Human Health

Respondent shall assess each alternative in terms of the extent to which it mitigates short- and long-term potential exposure to any residual contamination and protects human health, both during and after implementation of the corrective measures. The assessment will describe the levels and characterizations of contaminants on site, potential exposure routes, and potentially affected populations. Each alternative will be evaluated to determine the level of exposure to contaminants and its reduction over time. For management of mitigation measures, the relative reduction of impact will be determined by comparing residual levels of each alternative with existing criteria, standards, or guidelines acceptable to EPA.

4. Institutional

Respondent shall assess relevant institutional needs for each alternative. Specifically, the effects of Federal, state, and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations, including requirements for construction and operating permits, on the design, operation, and timing of each alternative.

B. Cost Estimate

Respondent shall develop an estimate of the cost of each corrective measures alternative (and for each phase or segment of the alternative). The cost estimate shall include both capital and operation and maintenance costs.

1. Capital costs consist of direct (construction) and indirect (nonconstruction and overhead) costs.

a. Direct capital costs include:

- i) Construction costs: costs of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measures;

- ii) Equipment costs: costs of treatment, containment, disposal, and/or service equipment necessary to implement the action;
- iii) Land and site-development costs: expenses associated with purchase of land and development of existing property; and
- iv) Buildings and services costs: costs of process and nonprocess buildings, utility connections, purchased services, and disposal costs.

b. Indirect capital costs include:

- i) Engineering expenses: costs of administration, design, construction supervision, drafting, and testing of corrective measures alternatives;
- ii) Legal fees and license or permit costs: administrative and technical costs necessary to obtain licenses and permits for installation and operation;
- iii) Startup and problem solving immediately following startup (shakedown) costs: costs incurred during corrective measures startup; and
- iv) Contingency allowances: funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate facility characterization.

2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. Respondent shall consider the following operation and maintenance cost components:

- a. Operating labor costs: wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations;
- b. Maintenance materials and labor costs: costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;

- c. Auxiliary materials and energy: costs of items such as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;
- d. Purchased services: sampling costs, laboratory fees, and professional fees for which the need can be predicted;
- e. Disposal and treatment costs: costs of transporting, treating, and disposing of waste materials, such as treatment plant residues, generated during operations;
- f. Administrative costs: costs associated with administration of corrective measures operation and maintenance not included under other categories;
- g. Insurance, taxes, and licensing costs: costs of such items as liability and sudden accident insurance; real estate taxes on purchased land or rights-of-way; licensing fees for certain technologies; and permit renewal and reporting costs;
- h. Maintenance reserve and contingency funds: annual payments into escrow funds to cover (1) costs of anticipated replacement or rebuilding of equipment and (2) any large unanticipated operation and maintenance costs; and
- i. Other costs: items that do not fit any of the above categories.

C. Waste Minimization Plan

Respondent shall consider waste minimization options as part of the evaluation of the Corrective Measures Alternatives (CMAs). Respondent shall provide for each CMA per year of operation: an estimate and analysis of the quantity, volume and/or toxicity of the waste generated, including but not limited to, contaminated soil, sludge, ground water, etc.; methods to minimize the quantity, volume, toxicity and/or mobility of the waste to be generated, treated, stored or disposed of off site; the economic cost and benefits; and any other benefit, including, but not limited to, compliance benefits, liability benefits, safety benefits, etc.

**TASK III: JUSTIFICATION AND RECOMMENDATION OF THE CORRECTIVE MEASURE OR MEASURES**

Respondent shall justify and recommend a corrective measures alternative using technical, human health, and environmental criteria. This recommendation shall include summary tables which allow the alternative or alternatives to be understood easily. Tradeoffs among health risks, environmental effects, and other pertinent factors among the alternatives evaluated shall be highlighted. The EPA will select the corrective measures alternative or alternatives to be implemented, based on the results of Tasks I and II. At a minimum, the following criteria shall be used to justify the final corrective measure or measures.

**A. Technical**

1. Performance - corrective measure or measures which are most effective in performing the intended functions and maintaining the performance over extended periods of time shall be given preference;
2. Reliability - corrective measure or measures which do not require frequent or complex operation and maintenance activities and that have been proven to be effective under waste and facility conditions similar to those anticipated shall be given preference;
3. Implementability - corrective measure or measures which can be constructed and operated to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time shall be preferred; and
4. Safety - corrective measure or measures which pose the least threat to the safety of nearby residents and environments, as well as to workers, during implementation will be preferred.

**B. Human Health**

The corrective measure or measures must comply with existing EPA criteria, standards, or guidelines for the protection of human health. Corrective measures which provide the minimum level of exposure to contaminants and the maximum reduction in exposure over time shall be preferred.

**C. Environmental**

The corrective measure or measures posing the least adverse impact (or greatest improvement) over the shortest period of time, on the environment, shall be favored.

**TASK IV: REPORTS**

Respondent shall prepare a Study of Alternatives Report presenting the results of Tasks I through III and recommending a corrective measures alternative. Four copies of the preliminary report shall be provided by Respondent.

**A. Progress**

Respondent shall, at a minimum, provide the EPA with signed, bimonthly progress reports containing:

1. Description and estimate of the percentage of the SOA completed;
2. Summaries of all findings;
3. Summaries of all changes made in the SOA during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups, or state government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during the reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

**B. Draft**

The Report shall, at a minimum, include:

1. Description of the facility:
  - a. Site topographic map and preliminary layouts.
2. Summary of the corrective measure or measures:
  - a. Description of the corrective measure or measures and rationale for the selection(s);
  - b. Performance expectations;
  - c. Preliminary design criteria and rationale;

- d. General operation and maintenance requirements; and
  - e. Long-term monitoring requirements.
- 3. Summary of the RCRA Facility Investigation SAMR Program and its impact on the selected corrective measure or measures:
  - a. Field studies (ground water, surface water, soil); and
  - b. Laboratory studies (bench scale, pick scale).
- 4. Design and implementation precautions:
  - a. Special technical problems;
  - b. Additional engineering data required;
  - c. Permits and regulatory requirements;
  - d. Access, easements, right-of-way;
  - e. Health and safety requirements; and
  - f. Community relations activities.
- 5. Cost estimates and schedules:
  - a. Capital cost estimate;
  - b. Operation and maintenance cost estimate; and
  - c. Project schedule (design, construction, operation).

Four copies of the draft shall be provided by Respondent to EPA. — —

C. Final

Respondent shall finalize the Study of Alternatives Report, incorporating comments received from EPA on the Draft Study of Alternatives Report.

ATTACHMENT F

**RESOURCE CONSERVATION AND RECOVERY ACT**

**RECORD OF DECISION**

**FACILITY NAME- AND LOCATION**

DuPont Experimental Station  
P.O. Box 80315  
Wilmington, Delaware 19898

**STATEMENT OF BASIS AND PURPOSE**

This decision document presents the selected Corrective Measure for the DuPont Experimental Station Facility in Wilmington, Delaware. This decision is based on the Administrative Record file for this Facility.


**DESCRIPTION OF THE CORRECTIVE MEASURE**

EPA has selected a "No Further Action with Monitoring" remedy at the Facility to address soil and groundwater contamination based on the Risk Assessment conclusion that conditions at the Facility do not pose a threat to human health and the environment. Deed restrictions will be recorded to address the unlikely use of groundwater for drinking and for the excavation of soil.

**DECLARATION**

At this time no remedial action is necessary to ensure protection of human health and the environment.

The "No Further Action with Monitoring" alternative at the DuPont Experimental Station will consist of a five (5) year groundwater monitoring program. Monitoring will be conducted quarterly for the first year, semi-annually the next three years and once during the fifth year. At year five, the schedule and need for monitoring will be reviewed by DuPont and recommendations will be submitted to EPA for review.

*for*  
  
EDWIN B. ERICKSON  
REGIONAL ADMINISTRATOR  
U.S. EPA, REGION III

9-30-91  
DATE

## **FACILITY BACKGROUND**

The DuPont Facility is located in Wilmington, New Castle County, Delaware. The Facility is situated in the Brandywine Valley along the banks of the Brandywine Creek as shown in Attachment 1. The Experimental Station is the corporate wide central research and development facility for DuPont. The Facility is dedicated to product research and development. Wastes generated during the research and development consist mainly of acetone, methanol, freon and dichloromethane. All wastes generated at the Facility are incinerated at the Facility's permitted hazardous waste incinerator.

The area of concern is a 9 acre portion of the Experimental Station facility. It is bounded by the Brandywine River to the south. Otherwise, the area is surrounded by property owned and controlled by DuPont. The area contains several buildings, paved roads, and paved parking areas situated on a steep hillside.

The subsurface materials consist of bedrock overlain by overburden consisting of a mixture of colluvium and fill material from a former burning pit area. The thickness of the overburden ranges from zero (at numerous bedrock outcrops) to 18 feet. The bedrock is a hard banden gneiss with narrow widely spaced joints. Banden gneiss is a massive body of rock which consists of interlocking crystals and has no porosity. This type of bedrock makes it nearly impossible for groundwater to pass through. The bedrock surface slopes toward the Brandywine Creek.

Groundwater below the Facility occurs at or near the interface between the bedrock and overburden. A few feet below the interface the bedrock has very low permeability. Infiltration from rainfall recharges the thin groundwater flow zone, which discharges at seeps along Creek Road and to the Brandywine Creek.

## **Site History**

The site has been active as a research facility for approximately 90 years. Prior to this, the area along the Brandywine Creek was used in the 1800's for gun powder manufacture by DuPont. Relic structures of these facilities are still in existence along the river front. Review of the Experimental Station files revealed little detailed information about former site activities that may be associated with the contamination sources. The only reference to possible original source areas of contamination is found on Facility blueprints from the 1940's which identified several suspected source areas: Oil storage building 166, Storage building 23 and Burning enclosure building 235.

However, there are no available records to indicate what materials were stored in these areas. An area identified as a burning pit was located south of the burning enclosure. This area was used as a burning pit for solvents. Based on pre-1946 blueprints, a burning pit for the disposal of on-site waste was located in this area. This pit may have received waste up until 1946. Based on this information, DuPont believed that the soils possibly contained "Dowtherm A", a low vapor pressure, heat exchange fluid. Dowtherm A is a mixture of diphenyl and diphenyl oxide manufactured by Dow Chemical.

According to DuPont files fill material in parking areas and some road beds in the area may have consisted of ash and other fill material obtained from the old burning pit area. Soil contamination was found near building 311 during utility excavation activities in 1986. This discovery led to a series of field investigations including the RCRA Facility Investigation. The purpose of the RFI is to characterize the extent of horizontal and vertical contamination at DuPont and to determine whether a Corrective Measures Study (CMS) is needed. A CMS is a study which investigates available technologies to remediate environmental problems at a facility.

#### SITE RISKS

##### Surface Water

The risk assessment concluded that no Facility risks exist in the surface water and Brandywine Creek sediments. The exposure scenarios for children and adults as recreational users of the Brandywine Creek and an industrial worker were used to calculate the risks at the Facility. EPA considers carcinogenic risks in the range of 1 in 10,000 ( $10^{-4}$ ) to 1 in 1,000,000 ( $10^{-6}$ ) to be protective of human health and the environment. All exposure scenarios considered for surface water were found to be within EPA's acceptable range.

The surface water samples were analyzed for priority pollutant VOAs, priority pollutant inorganics and biphenyl/biphenyl oxide. No samples were found to be above detection levels, therefore no cleanup goals were developed for the surface water.

##### Soil

The contaminant of concern in soil was benzo[a]pyrene. The maximum level found in soil was 46,960 parts per billion. The calculated risk of 1 in 100,000 for this contaminant was identified using the industrial worker exposure scenario. An EPA approved risk assessment was conducted at the Facility and concluded that during an excavation event an industrial worker at the DuPont Facility had a 1 in 100,000 chance of contracting cancer. The health based remediation goal for this contaminant

is 790 ppb. During an excavation event DuPont would have to remediate the soil to 790 parts per billion of benzo[a]pyrene to be protective of human health and the environment. The occurrence of the soil contamination correlates with the presence of fill material that includes ash and the location of the former burning ground area. The soil samples taken at the Facility were analyzed for volatile organics, biphenyl, biphenyl oxide, base neutral acids and the Appendix IX suite. The appendix IX suite is a group of chemicals that are listed in title 40 of the Code of Federal Regulations (C.F.R.) Part 264, Appendix IX. Worker exposure to contaminated soils is not possible due to concrete pavement and approximately 4 feet of clean fill above the contaminated soil.

### Groundwater

The maximum VOC concentration observed in site groundwater was 7700 ppb of trichloroethene (TCE). The Maximum Contaminant Level (MCL) for TCE is 5 ppb. MCLs are federally enforceable drinking water standards developed under the Safe Drinking Water Act (See 40 C.F.R. Part 141). The MCL of 5 ppb for TCE has been determined to be protective of human health and the environment. However, MCLs are based on groundwater being used for drinking water.

DuPont sampled 11 monitoring wells at the Facility and analyzed for priority pollutant volatile organic analysis, priority pollutant inorganics, biphenyl/biphenyl oxide and the Appendix IX suite. 1,2-dichloroethene and vinyl chloride were also detected in some of the wells, however the concentrations were not above the remedial goals estimated for the impact of groundwater discharge to the Brandywine Creek. The average flow in the Brandywine Creek is about 10,000 times greater than the groundwater discharge to the creek, therefore a contaminant would have to be 10,000 times greater than the MCL to impact the Brandywine Creek. The MCL for 1,2-Dichloroethene is 100 ppb and 2 ppb for Vinyl Chloride. These MCLs are also based on the assumption that the groundwater will be used for drinking water. However, groundwater at the Facility is in a thin, low yielding water-bearing strata and, therefore it would not be practical to use this aquifer as a source of drinking water. Also, there are no current users of the groundwater and to address the very unlikely use of the groundwater for drinking, deed restrictions will be recorded.

**DESCRIPTION OF THE "NO FURTHER ACTION WITH MONITORING ALTERNATIVE"**

The "No Further Action with Monitoring" alternative at the DuPont Experimental Station will consist of a five (5) year groundwater monitoring program. After five (5) years the need for continued monitoring will be reassessed. The monitoring activities will involve groundwater sampling, analysis of samples for VOCs, and measurement of groundwater elevations in wells. Surface water and sediments will not be part of the monitoring program at this time, however, they will be included if elevated levels of contamination are observed in the ground water wells. A groundwater well would have to greatly exceed the 7700 ppb of TCE (the highest level of contamination observed) to have an impact on the surface water and sediments.

Monitoring will be conducted quarterly for the first year, semi annually the next three years and once during the fifth year. At year five, the schedule and need for monitoring will be reviewed by DuPont and recommendations will be submitted to EPA for review.

The MCLs for drinking water for TCE, 1,2-DCE and Vinyl Chloride are 5, 100 and 2 ppb, respectively. However, since the groundwater at DuPont is not used for drinking water these levels would have to be multiplied by 10,000 to impact the Brandywine Creek. This standard will be utilized to determine adverse impacts to the Brandywine Creek and will be used in the following manner. All existing wells will be included in the monitoring network. Wells MW-3A, MW-3B, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9 and MW-10 will be used as points of compliance wells. The results of the VOC analyses for each of the constituents of concern will be averaged for the nine (9) compliance wells. Should the average concentration exceed 40% of a remedial standard or should any single analysis exceed 100% of a remedial standard, a resampling will be conducted within 30 days after receipt of the analysis. If the standards are still exceeded, DuPont must resubmit a Corrective Measures Study including Corrective Measure Alternatives to address the contamination to EPA for evaluation. Also, an interim measure that includes pumping and treatment of groundwater and a soil vapor extraction system to remediate the contamination of the Brandywine Creek will be implemented by DuPont. Deed restrictions will also be recorded to address the unlikely use of groundwater for drinking and for the excavation of soil.

DuPont Experimental Station  
P.O. Box 80315  
Wilmington, Delaware 19898

#### Purpose of EPA's Record of Decision

On February 15, 1989, EPA and DuPont entered into a consent order pursuant to Section 3013 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6934. Under the terms of this Consent Order, DuPont was required to complete an on-site and off-site investigation in order to determine the nature and extent of contamination from the DuPont Experimental Station located in Wilmington, New Castle County, Delaware (Facility) and to conduct a study which evaluates various clean-up alternatives.

DuPont has completed these investigations and has submitted to EPA for approval a RCRA Facility Investigation (RFI) and a Corrective Measures Study (CMS). DuPont also conducted a risk assessment at the Facility. The risk assessment concluded that conditions at the Facility do not pose a threat to human health and the environment.

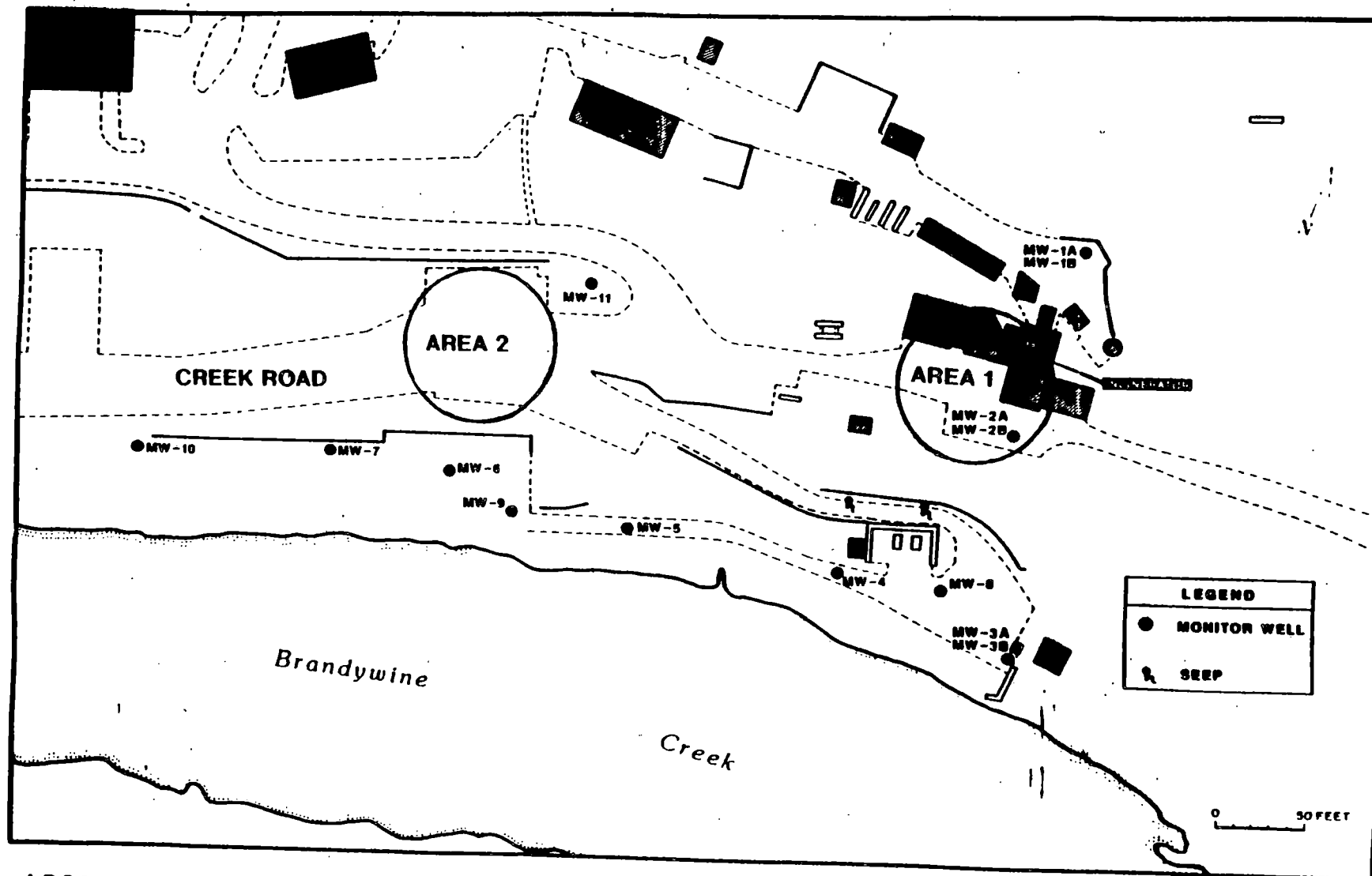
This Record of Decision describes the "No Further Action with Monitoring" remedy selected by EPA. This document will summarize the findings of the RCRA Facility Investigation, Corrective Measure Study and the Risk Assessment conducted by DuPont.

A public comment period was held for the proposed corrective measure for the Facility from August 26, 1991 through September 25, 1991. EPA also held a public meeting to discuss the Preferred Corrective Measure Alternative for the Facility on September 17, 1991 at the Concord Pike Library, 3406 Concord Pike, Wilmington, Delaware. Information about the public comment period and the meeting was placed as a display advertisement in the Wilmington News Journal on August 26, 1991 and in the Gazette on September 4, 1991.

The purpose of the public comment period and the public meeting was to provide an opportunity for any interested citizens to submit their questions and/or comments regarding the Corrective Measure Alternative to EPA. EPA did not receive any written comments during the public comment period, including the public meeting.

The Regional Administrator, EPA Region III, has made a final determination selecting the "No Further Action with Monitoring" Alternative as the Corrective Measure to be implemented at the DuPont Experimental Station Facility. This ROD also presents EPA's justification for the selection of the "No Further Action with Monitoring" alternative.

ATTACHMENT 1



LOCATION OF AREAS 1 & 2, MONITORING WELLS AND GROUNDWATER SEEPS



# VANDEMARK & LYNCH, INC.

ENGINEERS • PLANNERS • SURVEYORS

4305 MILLER RD./PO BOX 2047  
WILMINGTON, DE 19898/(302) 764-7635

Project No. 17759.26  
Drawing No. 30126-Le

August 23, 1993

Description of a portion of property of E.I. duPont deNemours & Company, known as the Creek Road Contamination Area, Experimental Station, Brandywine Hundred, New Castle County, Delaware.

BEGINNING at the northwesterly corner of building no. 249;

THENCE from said point of Beginning, North 54°-15'-47" East, 692.91 feet to a point, a portion of said course being along the northwesterly face of said building no. 249;

THENCE, 35°-44'-13" East, 502.09 feet to a point on the top of the bank of the Brandywine Creek;

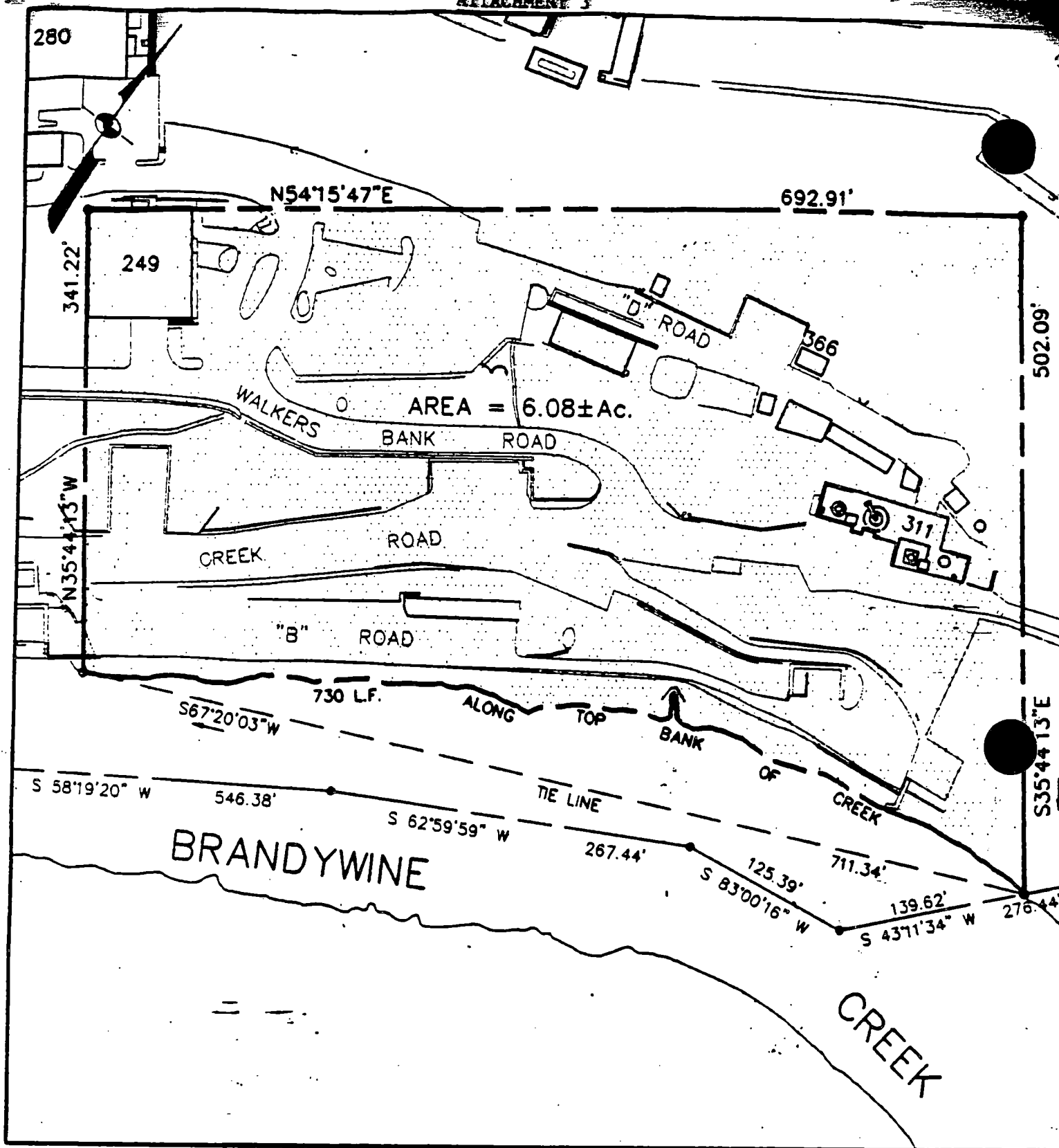
THENCE along the top of bank of the Brandywine Creek in a southwesterly direction 730.00 feet to a point, said point being distant from the last described point by a tie line of South 67°-20'-03" West, 711.34 feet;

THENCE 35°-44'-13" West, 341.22 feet to the point and place of Beginning, a portion of said course being along the southwesterly face of said building no. 249;

CONTAINING within said metes and bounds, 6.08 acres of land, being the same, more or less...

JEC/jbk

Checked By 



PLAN OF  
CREEK ROAD CONTAMINATION AREA  
E.I. DUPONT DE NEMOURS & COMPANY, INC.  
EXPERIMENTAL STATION

BRANDYWINE HUNDRED ~ NEW CASTLE COUNTY ~ DELAWARE

SCALE: 1"=100'

AUGUST 20, 1993



**VANDEMARK  
& LYNCH, INC.**

ENGINEERS - PLANNERS - SURVEYORS  
4230 MILLER RD., F.O.  
WASHINGTON, DC 20007

DESIGNED BY J. KUSZ	PROJECT MANAGER J. CHANDLER	<i>Walter W. Winkler</i>	
CHECKED BY D. MCCANN	DRAWN BY J. MCCANN		
REFERENCE 29891-F 29835-F	PROJECT NO. 17759.26	FILE NO. 30126-LE	SHEET 1 OF 1